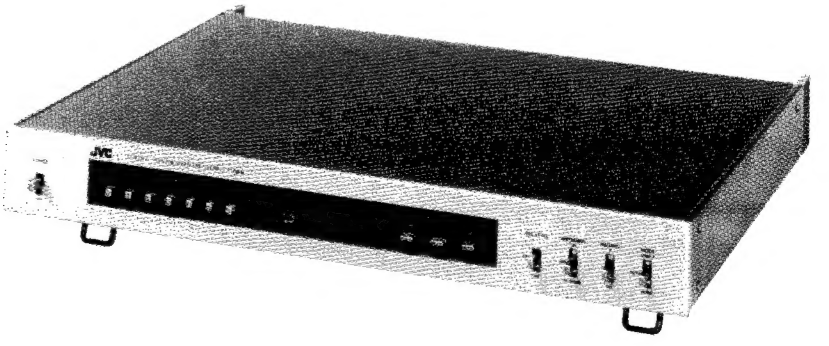
JVC

SERVICE MANUAL

MODEL T-3030

FM STEREO TUNER



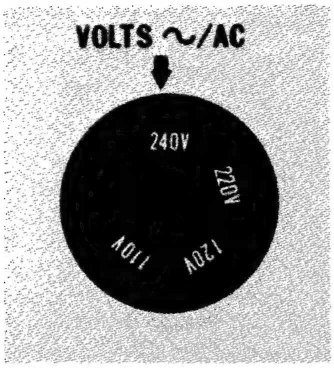
No.2[illegible]49
APR.1978

Contents

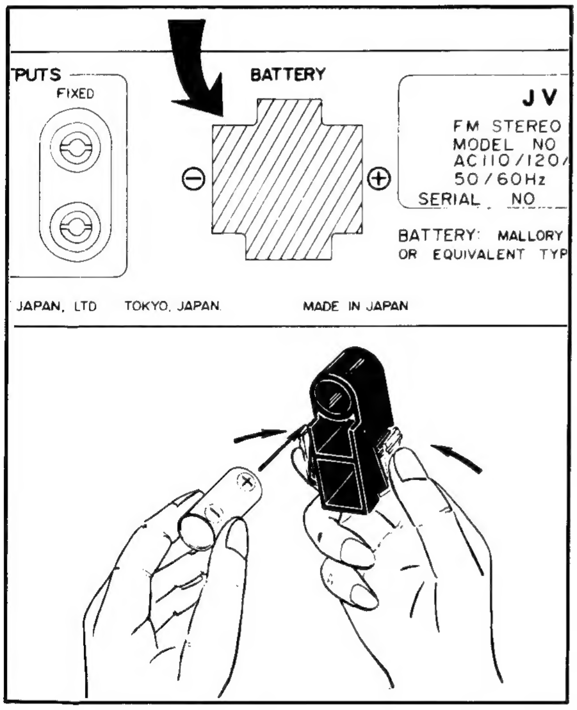
Warning!
When replacing the parts marked with ⚠ in the schematic diagram, be sure to use the designated parts to ensure safety.

1. Voltage Settings

This SET is switchable to the line voltage of 110, 120, 220 and 240 volts AC; 50/60 Hz.
The changeover switch is placed on the rear panel of the set.
To select another voltage, turn the changeover switch with a screwdriver or coin.



2. Battery Installation

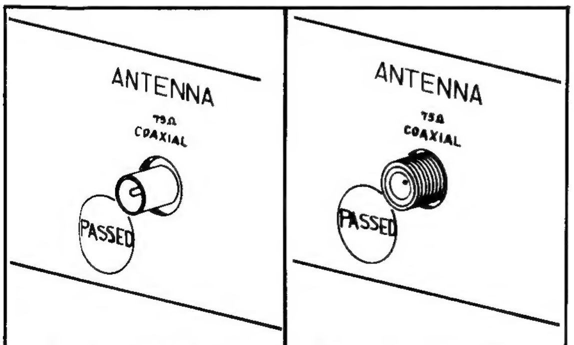


A 6 volts 4G13 type battery is supplied with this unit. This battery is needed to store the preset data and provide accurate frequency indication.
Before use, install the provided battery properly by observing its polarity and the signs indicated on the unit. Without loading the battery, the memory circuit and digital frequency indicator will not function properly.

Notes:

- When employing a battery other than provided, be very cautious to use one of the same type. There are several batteries having the same shape, but of different voltages. The battery suited for this unit is the 4G13 (6 volts).
- Do not heat, disassemble, short-circuit the battery and do not discard it in a fire.
- MALLORY's PX-28 or EVEREADY's E544 are suitable substitutes for 4G13.

3. Antenna Connector



PAL Type/DIN Type | **F Type/American Type**

A proper connector to the antenna coaxial cable is provided on sets for the U.S.A., Canada and the US Military market, but not on sets for European countries, Australia and other countries. If the set is not provided with a connector, please obtain the proper connector for making the antenna feeder connection.

4. Specifications

FM TUNER SECTION

		MONO	STEREO
Tuning Range		: 87.6 MHz — 108.0 MHz	
Tuning Accuracy		: Less then ± 1 kHz (25°C)	
Frequency Drift		: Less than 0.001 % (−5°C ∿ 40°C)	
Usable Sensitivity		: 0.9 μV/75 Ω (10.3 dBf IHF)	
50 dB S/N Sensitivity		: 1.9 μV/75 Ω (16.8 dBf IHF)	19 μV/75 Ω (36.8 dBf IHF)
Image Response Ratio		: 110 dB	
IF Response Ratio		: 110 dB	
Spurious Response Ratio		: 110 dB	
RF Intermodulation		: 100 dB	
Capture Ratio		: 1.0 dB	
Alternate Channel Selectivity		: 80 dB (± 400 kHz)	
AM Suppression Ratio		: 65 dB	
Distortion	100 Hz	: 0.1 %	0.1 %
	1 kHz	: 0.08 %	0.1 %
	6 kHz	: 0.1 %	0.1 %
Intermodulation Distortion		: 0.05 %	0.08 %
Signal to Noise Ratio		: 75 dB	72 dB
Stereo Separation	100 Hz	: 45 dB	
	1 kHz	: 50 dB	
	10 kHz	: 45 dB	
Subcarrier Product Ratio		: 70 dB	
SCA Rejection Ratio		: 70 dB	
Muting Threshold	Mute 1	: 2 μV/75 Ω (17.3 dBf)	
	Mute 2	: 16 μV/75 Ω (35.3 dBf)	
Stereo Threshold	Mute 1	:	2 μV/75 Ω (17.3 dBf)
	Mute 2	:	16 μV/75 Ω (35.3 dBf)
Frequency Response		: 50 Hz ∿ 10 kHz ± 0.3 dB 30 Hz ∿ 15 kHz +0.3, −0.5 dB	
Deemphasis		: 25 μsec/50 μsec/75 μsec	
Output Level	Variable Out	: 0 — 1.5 V/2.5 kilohms	
	Fixed Out	: 750 mV/2.5 kilohms	
	Rec. Level	: Corresponds to 50 % FM Mod. at 330 Hz	
	Det Out	: 160 mV/2.5 kilohms	
Antenna Input Impedance		: 75 ohms unbalanced coaxial	

DIMENSIONS

(H x W x D) : 61 mm x 420 mm x 348 mm

WEIGHT : 5.2 kg

POWER SPECIFICATIONS

Disignated Areas	Line Voltage & Frequency	Power Consumption
U.S.A.	AC 120 V, 60 Hz	19 W
CANADA	AC 120 V, 60 Hz	19 W
U.K., AUSTRALIA	AC 240 V∿, 50 Hz	19 W
CONTINENTAL EUROPE	AC 220 V∿, 50 Hz	19 W
U.S.MILITARY MARKET	AC 110 V, 50 Hz/60 Hz	15 W
OTHER AREAS	AC 110/120/220/240 V Selectable 50/60 Hz	19 W

5. Features

- Quartz PLL Frequency Synthesizer for maintaining high accuracy of reception in frequencies of 100 kHz spacings.
- All electronic controlled manual tuning in addition to a 7-station preset tuning convenience.
- Phase Locked Loop (PLL) discriminator for high performance and elimination of interference, unaffected by variations in environment or in aging.
- Surface Acoustic Wave (SAW) filter to insure ideal transferring characteristics and superb selectivity for hi-fi reception.
- Automatic Pilot Signal Canceller circuit and negative feed backed decorder employed in the MPX demodulator IC for obtaining extremely low distortion during FM stereo reception.
- 2 Dual Gate MOS FETs and 2 double tuned circuits employed to gain a high performance in receiving various levels of input signals.
- Anti-birdy filter with defeat switch employed to eliminate noise interference during FM stereo reception.
- 7-segment indicator shows both the receiving frequency and the preset number, and 5 LED indicators for showing input signal level to the antenna terminal.
- REC LEVEL calibrator is a convenience for adjusting to a highly accurate recording level.
- Coaxial antenna connector for hookup to an FM aerial with correct impedance.

6. Explanation of New Technology

6-(1) Synthesizer Circuit

The word "synthesizer" has become shomewhat popularized with the increase of what is known as "electronic music" produced by a "music synthesizer". Likewise, the term "frequency synthesized tuner" is becoming more and more popular with the increasing number of such tuners which have appeard on the market.
As the term "frequency synthesized" suggests, those tuners incorporate a frequency synthesizer circuit, which can be constructed in various ways. The T-3030 frequency synthesized FM tuner employs a PLL (Phase-Locked Loop) synthesizer in which a closed loop containing a reference crystal oscillator is constructed, thereby providing a highly stable and accurate reception.

Fig. 1 shows a block diagram of the frequency sunthesizer circuit employed in the T-3030.

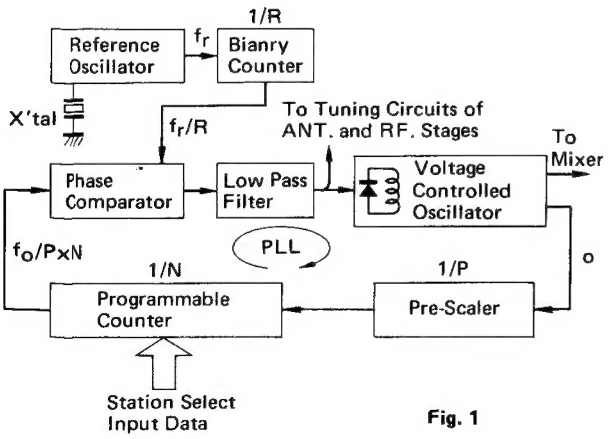


Fig. 1

The VCO (voltage controlled oscillator) in the PLL circuit functions as a local oscillator and is constructed as a resonance circuit consisting of a variable capacitance diode. The VCO oscillating frequency varies according to the DC output voltage from the low-pass filter. The frequency to be received is determined by the mixer which accepts the VCO output. The DC output voltage of the low-pass filter is also applied to the variable capacitance diodes of the antenna and RF tuning circuits for them to be tuned in to a signal freqency corresponding to this voltage. The VCO output frequency far exceeds the upper limit of frequencies that the programmable counter can accommodate. A prescaler is, therefore, inserted between the VCO and the programmable counter to step down the VCO output frequency until it permits the counter to operate with a sufficiently high accuracy. The programmable counter is a circuit for dividing the VCO output frequency by a divider which differs for different selected station data so that the divided frequency always equals that of the reference frequency which enters the phase comparator. The reference oscillator employs a crystal for obtaining a stable and accurate output frequency. The accuracy and stability of the received frequency depends upon the accuracy of this reference oscillator, which is, in this sense, considered to be the most important component in this circuit. The output frequency of the reference oscillator is stepped down through frequency dividers until it reaches a frequency which is most suitable for phase comparison. The outputs of the programmable counter and the reference oscillator enter the phase comparator, which produces an error voltage if there is a difference between these two signals. When their phases coincide with each other and an error voltage is no longer produced, the PLL loop is stabilized and its output takes a steady state. The phase comparator output contains various components including the signals to be compared and other high and low frequency components. However, since only the DC component is to be applied to the

VCO, a low-pass filter is provided to obtain frequencies lower than predetermined value. The time constant of this low-pass filter is one of the factors which determines the time required for the entire loop to reach its locked state. Therefore, if a time constant large enough to completely suppress the AC components is selected, it takes some time for reception to be stabilized. On the contrary, however, if too small a time constant is selected, some difficulties are encountered while reception can be rapidly stabilized; i.e. much of the AC component leaks out into the VCO, where it is converted into FM signals and enters the mixer. This means that these FM signals are demodulated as well as the received signals and are present in the final demodulated signal output, causing the signal-to-noise ratio to deteriorate. For this reason, the low-pass filter is another key component in the design of this circuit.

Summing up the principle of the frequency syntheseizer circuit, the reception frequency is determined by the frequency division ratio of the programmable counter and stabilized when the two inputs to the phase comparator equals each other. Consequently, the relationship between these parameters can be expressed by the following equation:

$$\frac{f_r}{R} = \frac{f_o}{P \times N} \quad \ldots\ldots\ldots\ldots\ldots\ldots (1)$$

Where f_r = oscillating frequency of the reference oscillator,
f_o = oscillating frequency of the VCO,
R = frequency division ratio of the binary counter (frequency dividers),
P = frequency division ratio of the pre-scaler, and
N = frequency division ratio of the programmable counter.

In an actual tuning operation, the reception frequency is determined by varying the frequency division ratio of the programmable counter N. Therefore, rearranging the equation (1), we obtain:

$$N = \frac{f_o}{f_r} \times \frac{R}{P} \quad \ldots\ldots\ldots\ldots\ldots\ldots (2)$$

In this connection, f_o is the input to the mixer from the VCO which functions as a local oscillator and, therefore, must always be a frequency which is higher than the received frequency by a value corresponding to the IF frequency (10.7 MHz). In the T-3030, 3.6 MHz is chosen for f_r, 360 for R and 10 for P. As a result, the phase comparison frequency is $\frac{3.6\,\text{MHz}}{360} = \frac{3\,600\,\text{kHz}}{360} = 10$ kHz.

In order to enable tuning into frequencies from 87.6 MHz to 108 MHz in 100 kHz steps, the following relationship between the tuned frequency f_a, VCO frequency f_o and the frequency division ratio of the programmable counter N is required as determined by the equation (2).

f_a	f_o	N
87.6 MHz	98.3 MHz	983
87.7 MHz	98.4 MHz	984
87.8 MHz	98.5 MHz	985
.	.	.
.	.	.
.	.	.
108.0 MHz	118.7 MHz	1187

Tuning is, therefore, performed by entering a tuning data which specifies the value of N.

The DC output voltage supplied from the low-pass filter to the antenna and RF tuning circuits varies as shown in this diagram in relation to the reception frequency since the VCO output is specified at intervals of 100 kHz. The tracking of each tuning circuit is adjusted so that maximum sensitivity is obtained at each operating point.

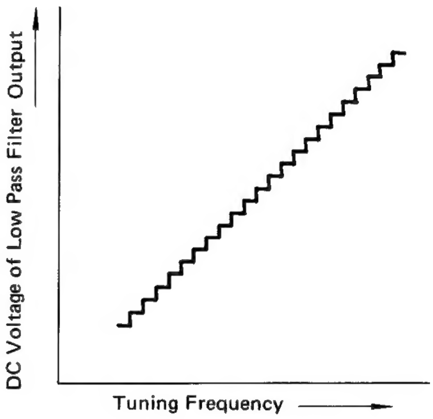


Fig. 2

The accuracy and stability of reception is dealt with in the following. In equation (1), R, P and N are predetermined and not subject to variations as long as the frequency divider stages of the corresponding blocks function properly in their counting operations. Consequently, the accuracy and stability of reception; namely, those of the VCO frequency, can be replaced with the accuracy and stability of the reference oscillator frequency, as suggested by the following equation:

$$f_o = \frac{P \times N}{R} \cdot f_r \quad \ldots\ldots\ldots\ldots\ldots\ldots (3)$$

For example, when tuning in a frequency of 90.0 MHz, we obtain:

$$f_o\,(90.0 + 10.7) = \frac{10 \times 1007}{360}\, f_r\,(3.6) \doteqdot 28 f_r$$

Of the result $28f_r$, f_r is the oscillating frequency of the highly accurate and stable crystal oscillator and also is established as a one-25th of the received frequency. This means that is can be safely said that the accuracy of the crystal oscillator is tantamount to that of the received frequency, resulting in an extremely stable and accurate reception.

6-(2) Surface Acoustic Wave (SAW) Filter

A resonance circuit consisting of a coil and a capacitor, usually called "IFT", or a ceramic filter which utilizes the thickness oscillation of a ceramic plate is commonly used as a filter which determines the selectivity of the IF stage of a tuner. However, in light of the demand for increased performance in tuners, research has been conducted towards developing improved filters. The surface acoustic wave filter is just such a filter resulting from this research. The illustration below depicts the internal structure of this filter.

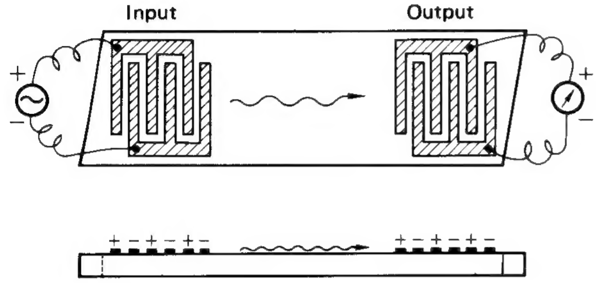


Fig. 3

As can be seen from the illustration a set of "comb-like" electrodes are arranged on either end of the piezoelectric material. These two sets of electrodes serve as receiver and transmitter of signals.
When an AC signal is applied to one set of oppositely positined electrodes which serves as a transmitter, this set of electrodes tend to attract each other. This results in mechanical strain produced on the surface of the piezoelectric material at intervals corresponding to those of the teeth of electrodes. This series of strains become vibrations that propagate in the direction towards the set of electrodes serving as a receiver since the teeth of the electrodes are equispaced. When these vibrations reach the receiving set of electrodes, the output signal appears at both terminals of this set of electrodes since the receiving set of electrodes are also of this equispaced configuration. The highest output level is obtained at a signal corresponding to the intervals the teeth of electrodes. For this reason, selectivity characteristic can be obtained, since the delay time of the output signal depends on the propagation speed of vibrations along the piezoelectric material; being constant regardless of signal frequencies. In other words, the frequency vs. delay characteristic is flat. Since "frequency modulation" is to render the loudness of audio signals as variations of frequencies, FM signals will be distorted if the delay time does not change linearly according to frequency. The delay time per unit of frequency variations is called a group delay. If the group delay characteristic is flat, no distortion is caused. The diagram below shows the relation between distortion and the group delay.

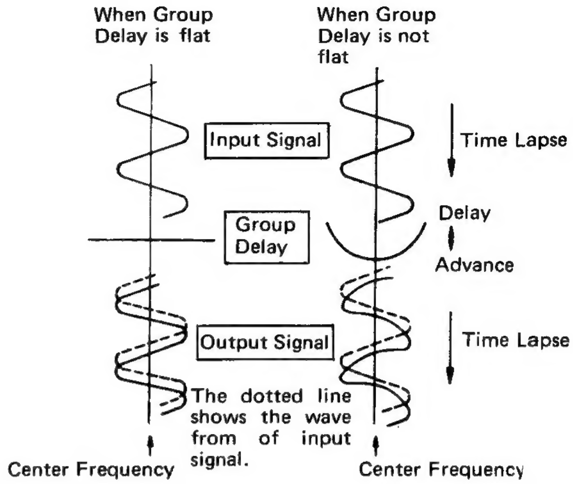


Fig. 4

The reason why a filter is inserted in the IF stage is to pass desired signals alone without passing unwanted signals belonging to unnecessary frequency bands. In short, the purpose of a filter in the IF stage is to provide a certain degree of selectivity. Therefore, it is desirable that the amplitude characteristic is flat in the required frequency band, but is subject to steep attenuation outside that band. On the other hand, if the group delay characteristic is considered on its own, an ideal is a linear relationship between the group delay and frequency. The diagram below showns an ideal filter characteristic.

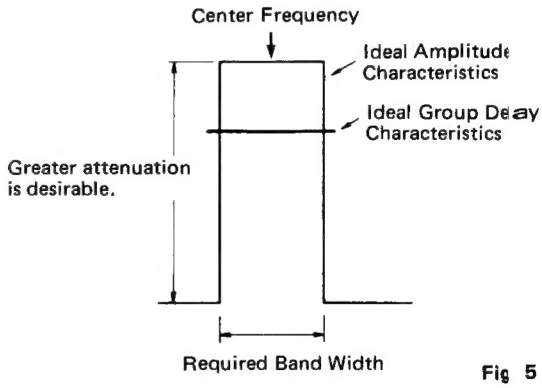


Fig 5

However, at present, it is impossible to obtain such an ideal filter. Constant effort has been made to devise a filter which is as near as possible to an ideal filter. In the conventional IFTs and ceramic filters, amplitude characteristic is incompatible with group delay characterristic. Therefore, it was difficult to obtain a filter having a sufficiently good characteristic. However, it is possible to obtain with a surface acoustic wave filter, an almost ideal characteristic, because in this case, improvement of the amplitude characteristic is sufficient, without having to consider the group delay characteristic.
In an actuality, with a surface acoustic wave filter, as well as waves being propagated along the surface of the piezoelectric material, some waves (bulk waves) penetrate inside the material.

These waves do not reach the receiving electrodes directly, but passing through the material to the opposite side, reflect from the opposite terminal, and thereby arrive at the receiving electrodes. Other waves, reflected from the receiving electrodes, reflect from the transmission electrodes again, and finally reach the receiving electrodes in this manner (triple transit echo). These particular type of waves are undesirable and various means of suppressing them have been employed. As a result, the filter employed in the T-3030 has the following excellent characteristic.

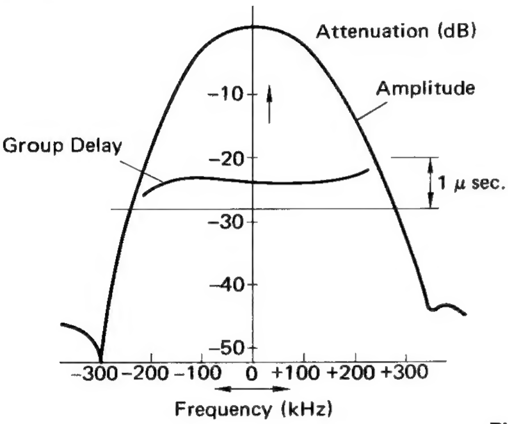


Fig. 6

6-(3) PLL FM Detector Circuit

CD-4 demodulators employ a PLL (Phase Locked Loop) circuit as a subchannel FM signal detector circuit. Concerning the principle of operation, the PLL circuit employed in the T-3030 has entirely the same parameter as that of the CD-4. However, the PLL circuit of the FM tuner deals with considerably higher frequencies.

	Carrier frequency	Maximum deviation	De-emphasis
CD-4	30 kHz	Approx. ±10 kHz	-6 dB/oct from 800 Hz to 6 kHz
FM tuner	10.7 MHz	±75 kHz	50 μsec or 75 μsec

Since the carrier frequency is higher than 10 MHz, considerable difficulties must be dealt with in the PLL circuit of the FM tuner, compared with the CD-4 demodulator. As shown in Fig. 7, the PLL circuit is a loop basically consisting of a phase comparator, a low-pass filter and a voltage controlled oscillator.

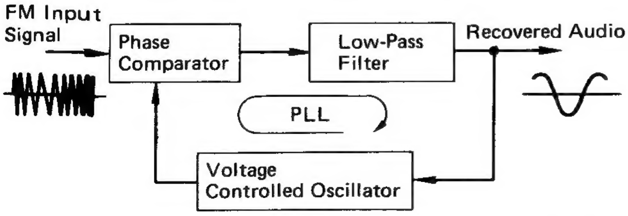


Fig. 7

It utilizes the operation of the loop which tends to align the phase of the output signal to that of the input signal. Therefore, the PLL circuit features excellent stability by absorbing variations of characteristics that are commonly due to temperature fluctuations and time lapse. The response of the loop to the FM input signal will be explained below. As shown in Fig. 8, when no FM input signal is present, the low-pass filter operates at its center frequency (free-runs), i.e. at point A, producing an output voltage of ± 0 V.

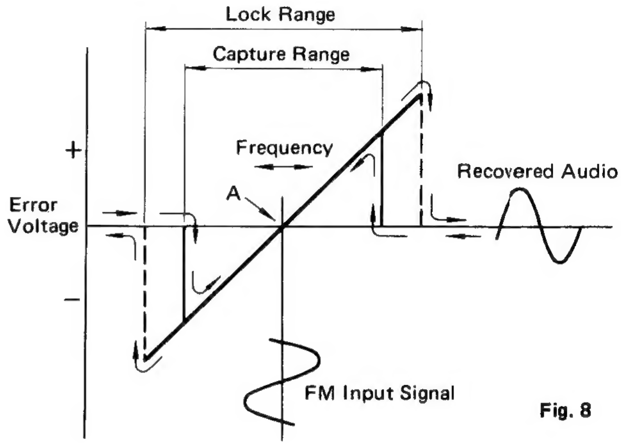


Fig. 8

However, when an FM input signal is present, the ouput voltage takes a positive or negative value corresponding to the difference of the frequency of the FM input signal and the center frequency. FM signal is a signal whose frequency changes according to the amplitude of an audio signal. Output voltages along the slope of the line shown in Fig. 8 are obtained according to input frequencies, thus providing FM detection. The typical requirements of the detector circuit in a hi-fi tuner are low distortion and good S/N ratio. To improve the performance of the detector circuit, a good linearity (differential gain characteristic) is first required. However, ingeneral if good linearity is sought over a wide frequency band, a demodulated output level, namely, S level of S/N ratio tends to lower. As a result, though non-linear distortion decreases, S/N ratio deteriorates. In short, low distortion is incompatible with good S/N ratio. To obtain a low distortion, a high S/N ratio and wide tuning capability; a wide dynamic range of the detector circuit is required. This PLL detector circuit uses various devices to acquire a wide dynamic range which was impossible for conventional PLL detector circuits to attain at such a high frequency of 10.7 MHz.

1. To decrease noise to the lowermost limit, the phase comparator, the output amplifier and the VCO have a special arrangement, and at the same time, special elements are employed. Above all, special attention is paid to obtain a low-noise. VCO.
2. To realize low distortion, the VCO has a resonance circuit consisting of twin variable capacitance diodes having a specially wide variable range. These diodes affect distortion directly and this particular combination of a specially selected diode pair is adopted.

Another feature of this PLL FM detector circuit is its proper AM suppression ability. This PLL FM demodulator effectively suppresses AM components which are caused when interference signals enter or when the FM signal passes the IF filter. As a result, the FM signal can be demodulated with low distortion. Furthermore, this PLL FM detector circuit functions as a demodulator only in the lock range, as shown in Fig. 8, and it does not respond to signals outside this range. That is to say, this PLL FM detector circuit has characteristics which serve as a kind of filter. For this reason, this new device is very effective as the detector circuit of the FM tuner which must detect FM input signals of different strengths from the strongest to the weakest. It is for the various reasons given above, that this FM tuner adopts the PLL detector circuit which is most suitable for FM detection.

6-(4) Pilot Signal Cancellation for PLL MPX Decoder

This circuit is not of a new technology. It had previously been adopted in our JT-V71. The technical information concerning this circuit has already been published for your reference. In the JT-V71, this circuit was of a discrete type. However, in T-3030 FM tuner, the operation of this circuit is performed in a newly fashioned IC. Refer to the technical description of the JT-V71 for the details of this circuit. Fig. 9 shows the block diagram of the basic construction of this IC.

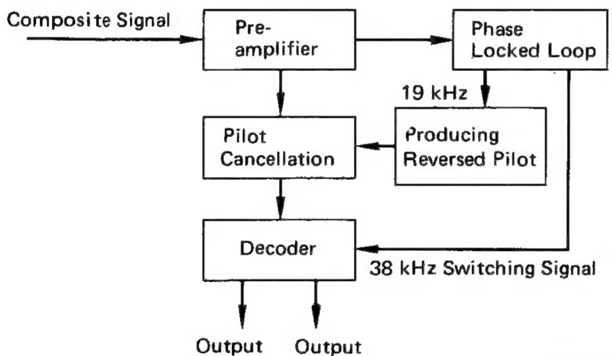


Fig. 9

In ordinary tuners, a composite signal is divided into the right and left channel signals by a decoder using a switching signal which is synchronized with a pilot signal. In this case, the pilot signal, which is entirely unnecessary, enters the decoder and passes unchanged into the L and R channel as output. Therefore, it is necessary to attenuate a frequency component higher than 15 kHz abruptly by a low-pass filter to prevent the leakage of the pilot signal. In this case, such a low-pass filter has the first attenuation pole at 19 kHz, and attenuates the pilot signal abruptly at 15 kHz. It is difficult to manuafacture a low-pass filter whose frequency response is flat up to 15 kHz. It is also difficult to make the delay characteristic flat over the whole frequency range. It is inevitable that the delay time increases as frequency increases. Therefore, there is a tendency that playback sound lacks definition especially in the higher frequency range, and only specific frequencies are given emphasis. In the pilot signal cancellation circuit, the pilot signal is cancelled prior to entering the decoder so that each output from the L and R channel contains only a very weak pilot signal. Therefore, it is unnecessary for the low-pass filter to be set at an attenuation pole of 19 kHz. As a result, the low-pass filter has a flat amplitude characteristic up to 15 kHz and considerably flat delay characteristic so that clear localization of playback sound is obtainable.

7. Main Parts Location and Part Numbers

Botton View

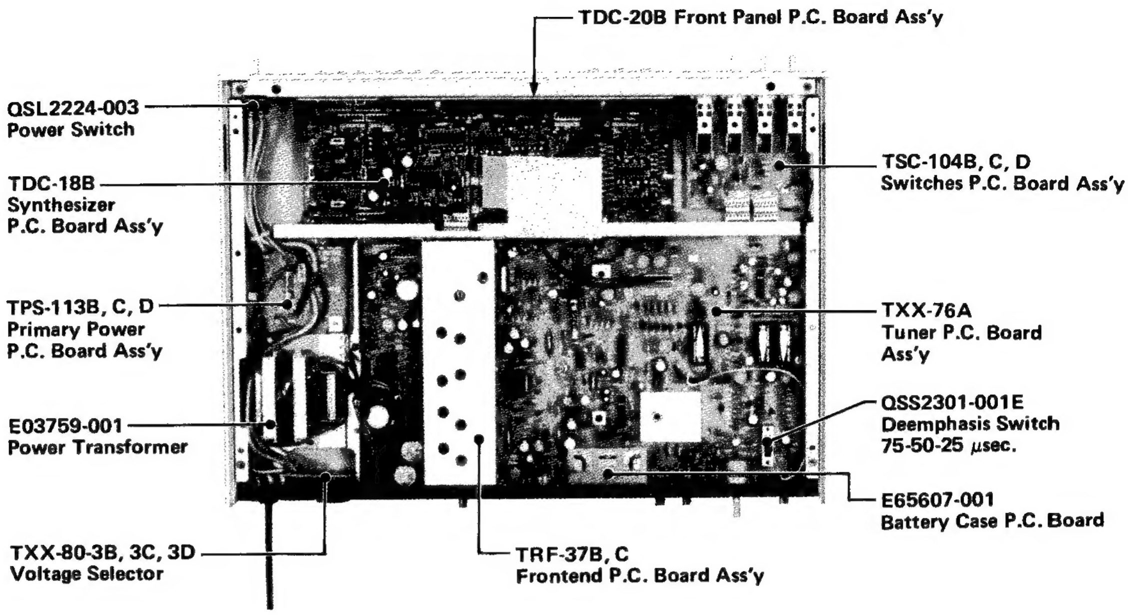


Fig. 10

Top View

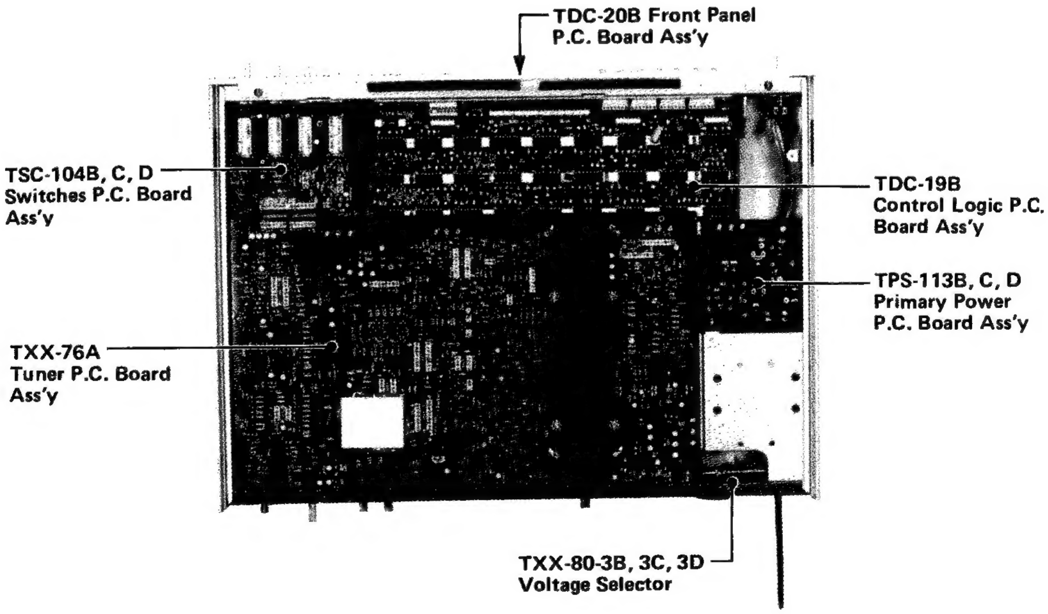


Fig. 11

8. Removal of the Parts Assembled on the Front Panel

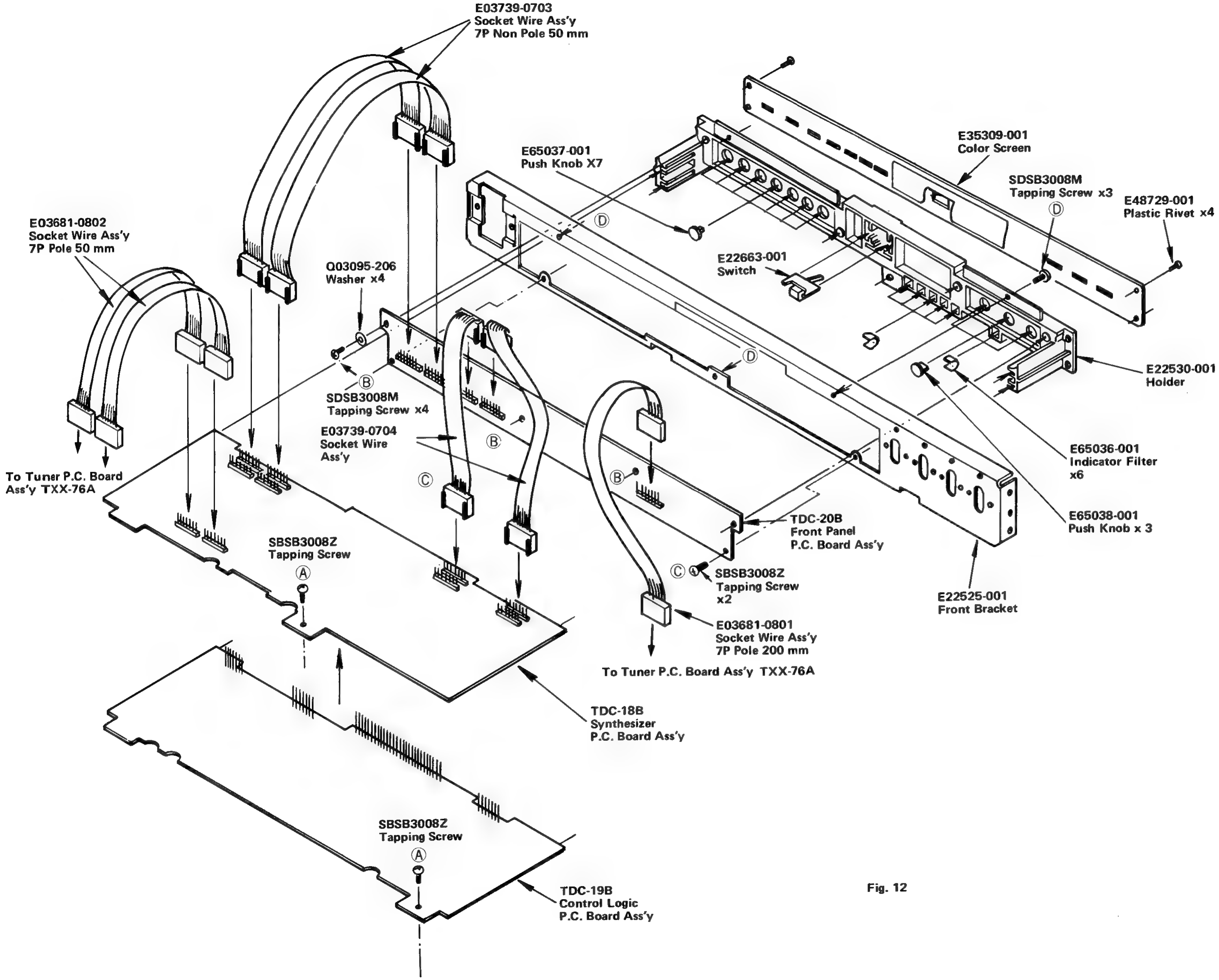


Fig. 12

Disassembling Procedures for The Front Bracket Assembly

1. Remove both screws on either side of the unit and bring the front panel forward.
2. Remove both screws holding the power switch and take it off.
3. Remove both screws on either side of the front bracket.
4. Remove each of the tapping screws Ⓐ which secures the synthesizer circuit board and control logic circuit board to the center bracket.
5. Unsolder the shielding plate from the shielding case of the synthesizer circuit board.
6. Disconnect both connectors at the rear part of the switch circuit board assembly, TSC-104A.
7. Disconnect one connector which connects the synthesizer circuit board to the front end, thereby enabling the disconnection of the complete front bracket assembly from the chassis.
8. Remove the four socket wire assemblies of the synthesizer circuit board and the display and switch circuit boards.
9. Slip out the synthesizer circuit board together with the control logic circuit board from the holding frame slots.
10. Remove the four tapping screws Ⓑ on the holding frame and the two tapping screws Ⓒ on the front bracket, and remove the display and switch circuit board.
    Thus you can disconnect the display and switch circuit board from the holding frame, allowing easy removal of following parts, because they are only inserted into the holding frame.
    E65037-001 Push knobs .... 7 pcs.
    E65038-001 Push knobs .... 3 pcs.
    E65036-001 Indicator filter .... 6 pcs.
    E22663-001 Switch .... 1 pc.
11. Remove three tapping screws Ⓓ to separate the holding frame from the front bracket.

The reverse order should be followed when assembling the front bracket assembly of the T-3030.

9. Exploded View and Part Numbers

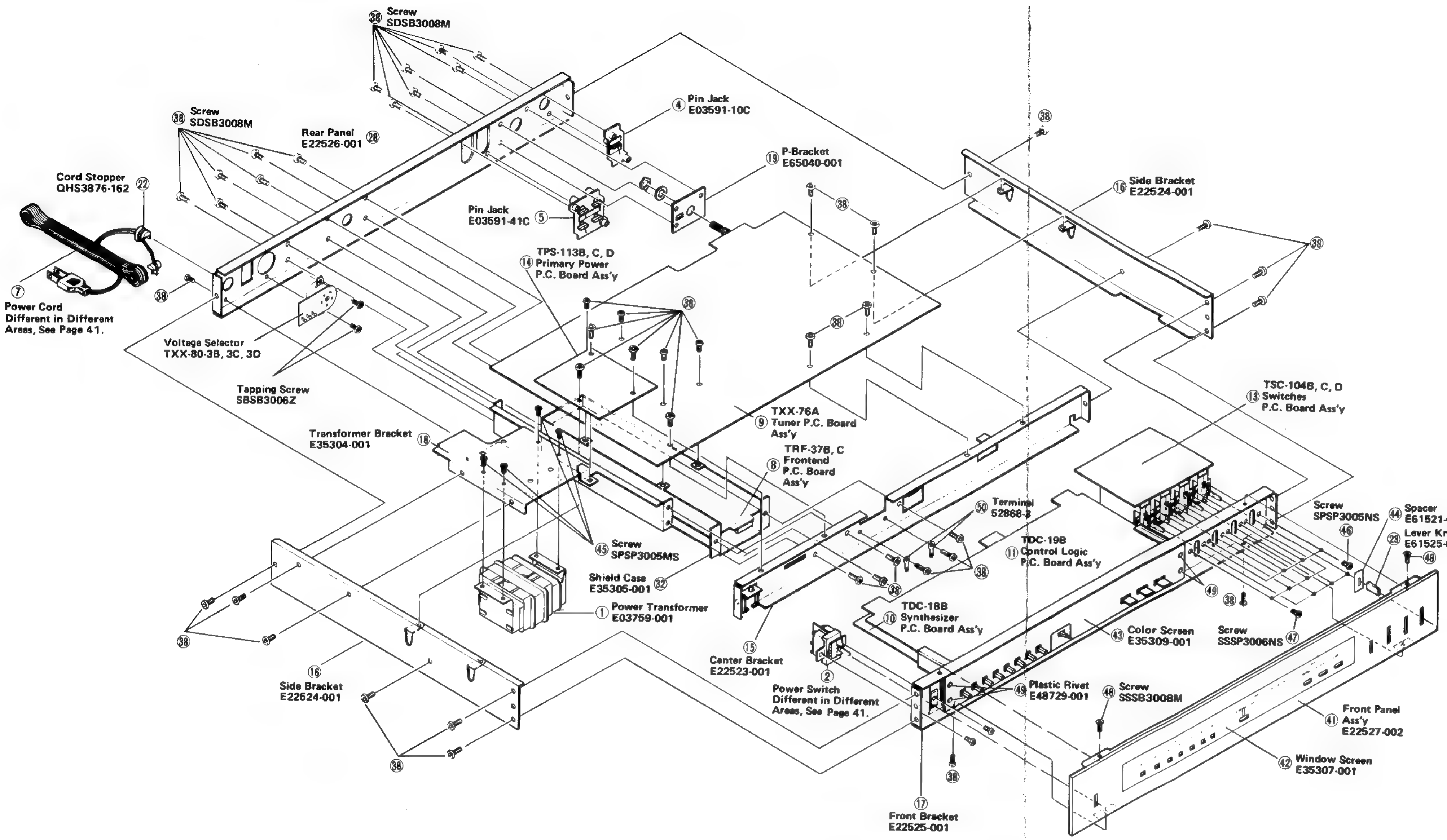


Fig. 13

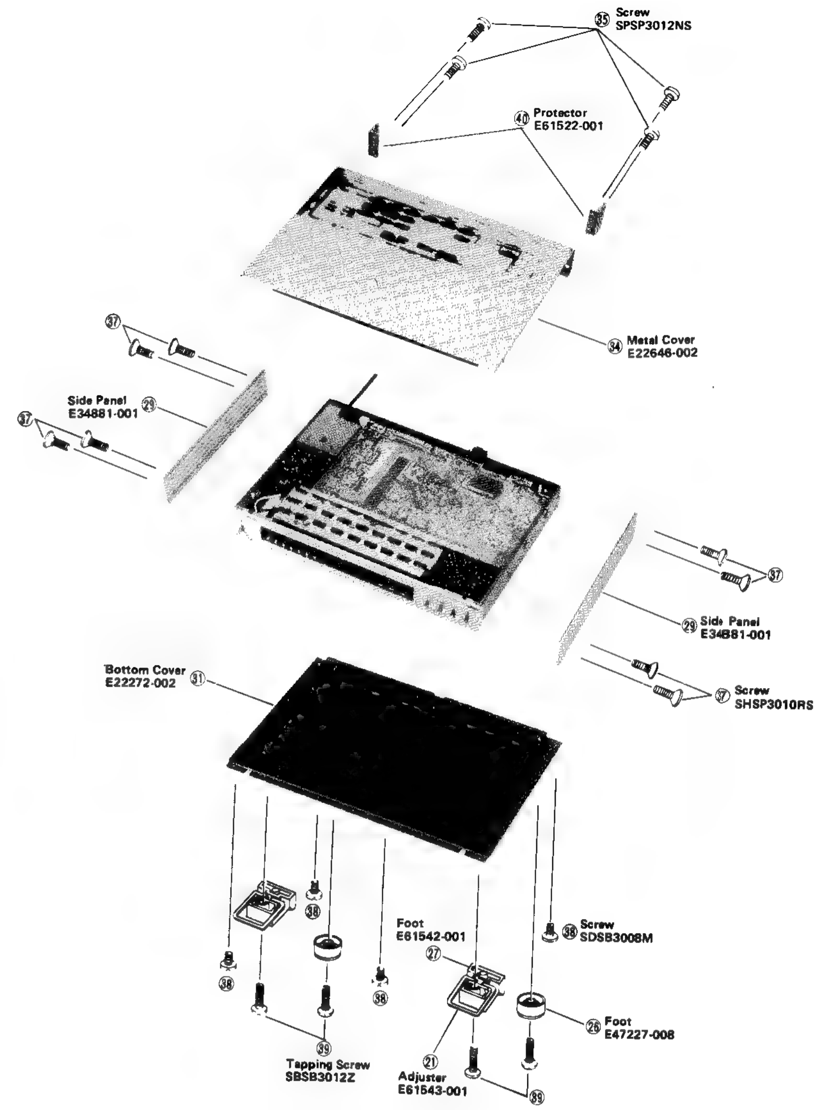


Fig. 14

10. Tuner Alignments

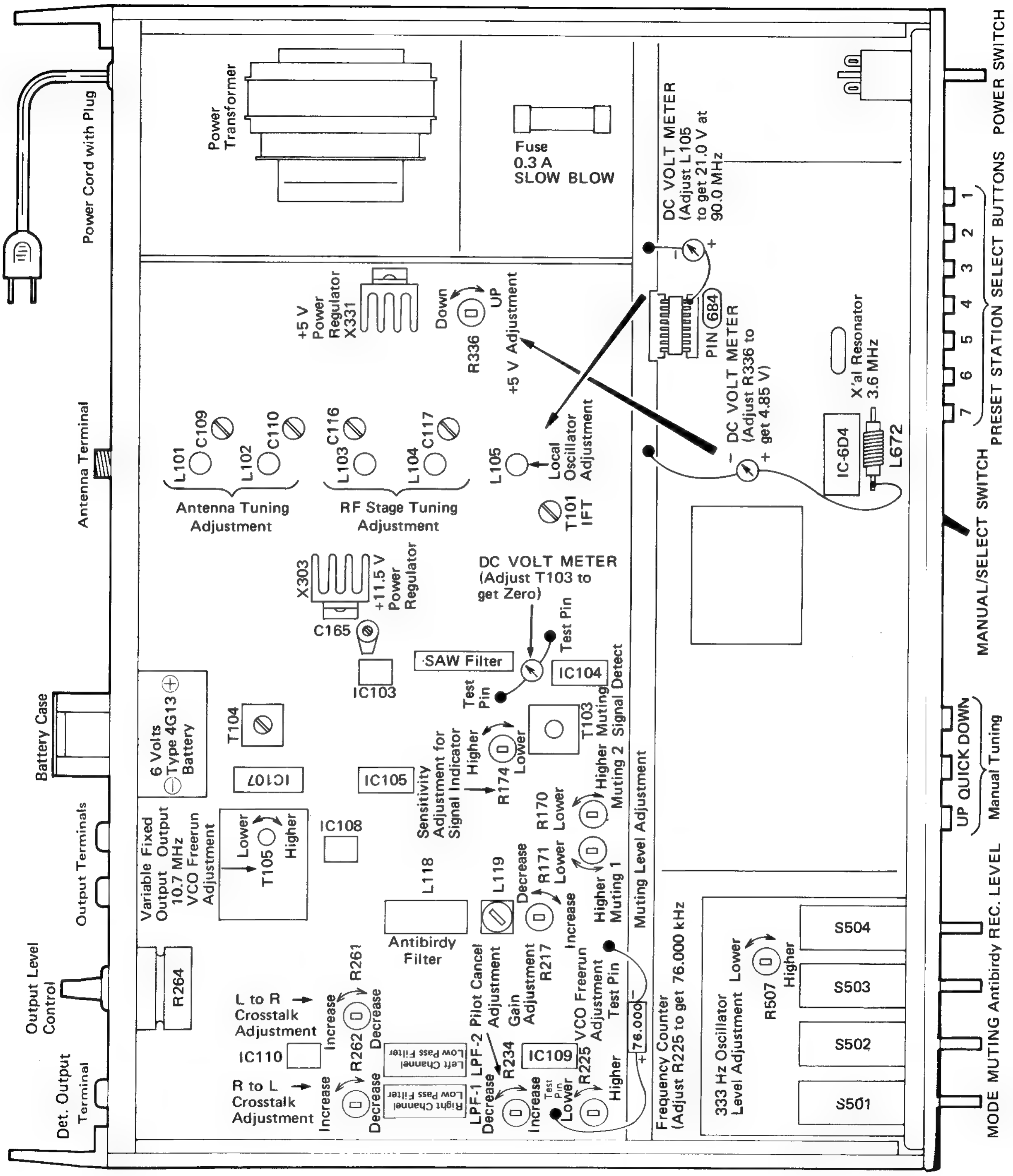


Fig. 15

ADJUSTMENTS

Adjustments for The Front End

L105: Local oscillator tuning coil: Connect a DC voltmeter between the terminal 684 and the chassis. Adjust the L105 so that the DC voltmeter reads 21.0 V when 108.0 MHz is tuned by setting the manual tuning button to its UP position.

L101:	ANT-1 tuning coil	Adjust so that the maximum sensitivity is obtained at 90.0 MHz.
L102:	ANT-2 tuning coil	
L103:	RF-1 tuning coil	
L104:	RF-2 tuning coil	
C109:	ANT-1 tuning trimmer	Adjust so that the maximum sensitivity is obtained at 106.0 MHz.
C110:	ANT-2 tuning trimmer	
C116:	RF-1 tuning trimmer	
C117:	RF-2 tuning trimmer	
T101:	IFT	Attenuate antenna input, and adjust to the maximum sensitivity.

Adjusting Points of The Tuning Detector

T103:	Tuning detector coil:	As shown in the page 12 illustration, connect the DC voltmeter between the test points. Adjust T103 so that the DC voltmeter reads "0".
R174:	Signal indicator sensitivity adjusting resistor:	Adjust R174 so that the signal indicators through number "4" light when the antenna input is 500 μV.
R170:	Muting threshold adjusting resistor:	Adjust R170 so that muting operates at MUTING "1", when the antenna input is 2 μV.
R171:	Muting threshold adjusting resistor:	Adjust R171 so that muting operates at MUTING 2, when the antenna input is 16 μV.
T105:	VCO free running frequency adjusting coil of FM PLL detection:	Adjust T105 to the mid-point of the lock range in which demodulated output appears.
T104:	IF stage phase adusting coil:	Adjust T104 so that the distortion factor of demodulated output reads minimum.
C165:	IF stage phase adjusting trimmer:	Adjust C165 so that the distortion factor of demodulated output reads minimum.
L118:	Antibirdy filter:	No adjustment is required, since L118 has been previously adjusted. If adjustment is necessary, L118 should be adjusted so that beats due to interference wave reads minimum.
L119:	Antibirdy phase equalizer:	No adjustment is required, since L119 has been previously adjusted. L119 is used to compensate for the delay chracteristic caused by the antibirdy filter. (to obtain the best possible frequency vs separation characteristic).

Adjustments for The FM MPX Demodulator

R225:	VCO free-running frequency adjusting resistor:	As shown in the illustration, connect the frequency counter between the test points. Adjust R225 so that the frequency becomes 76.000 kHz.
R234:	Pilot cancel adjusting resistor:	Adjust R234 so that the leaking pilot signal becomes minimum, while observing the FM stereo reception output by the oscilloscope.
LPF-1 and 2:	Low-pass filter:	No adjustment is required, because LPF-1 and 2 were previously adjusted. LPF-1 and 2 were adjusted so that carrier leakage at FM stereo becomes minimum.
R261:	Separation control L → R	Adjust R261 so that crosstalk from the left channel (L) to the right channel (R) becomes minimum. R262 R to L minimum.
R262:	" R → L	

Adjustments for the Recording Level Check

R507:	333 Hz oscillator output adjusting resistor:	Set the REC LEVEL switch to the CAL position. Adjust R507 so that the output level (about 333 Hz) of the oscillator becomes exactly the same as the output level of FM 50 % modulation.

Adjustments of the +5 V Line Voltage

R336:	+5 V voltage adjusting resistor:	As shown in the illustration, connect the DC voltmeter between the terminal of the choke coil, L672 and the chassis. Adjust R336 so that the line voltage reads +4.85 V.

11. Schematic Diagram

11-(1) Block Diagram

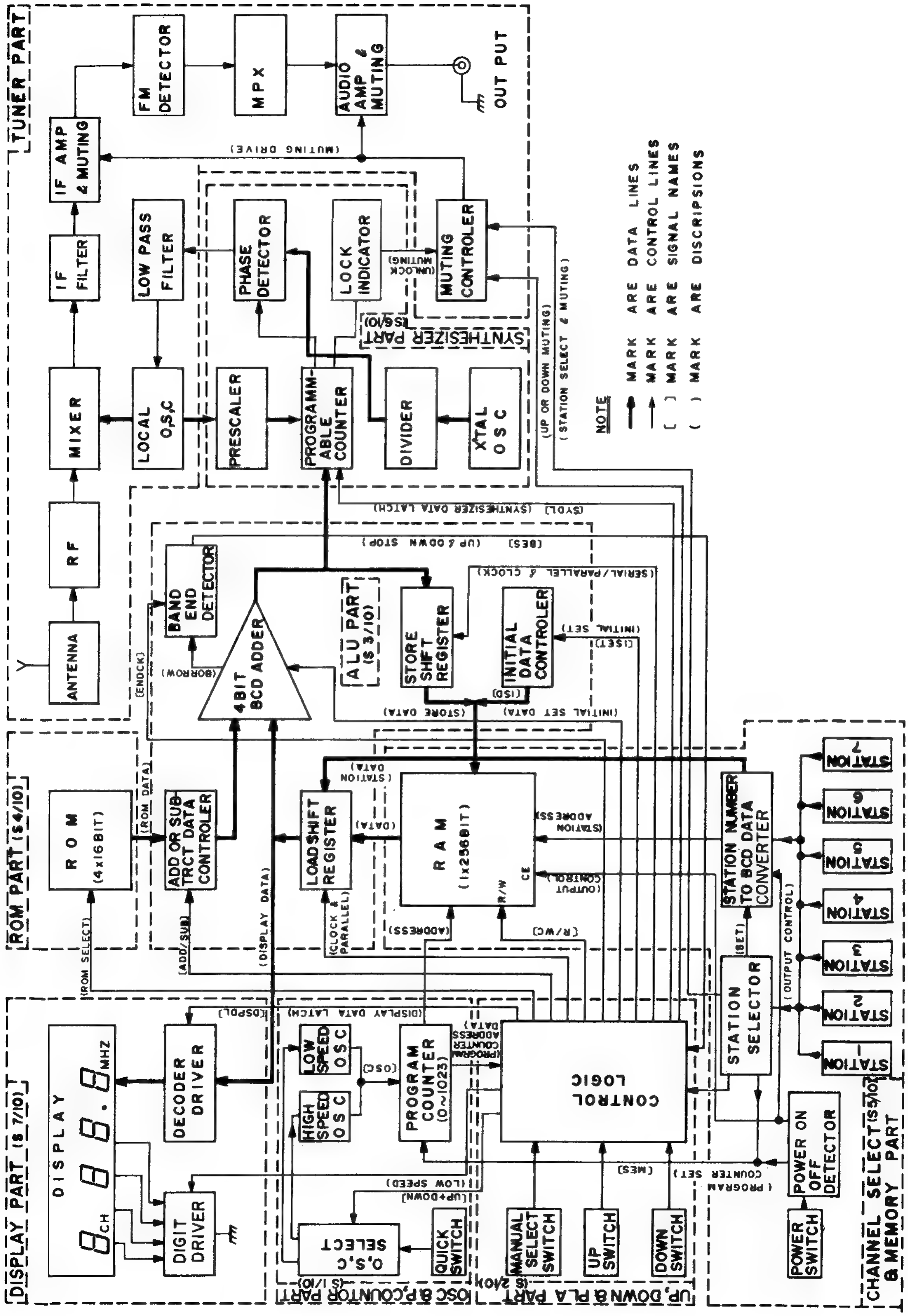


Fig. 16

11-(2) Pin Assignment of ICs

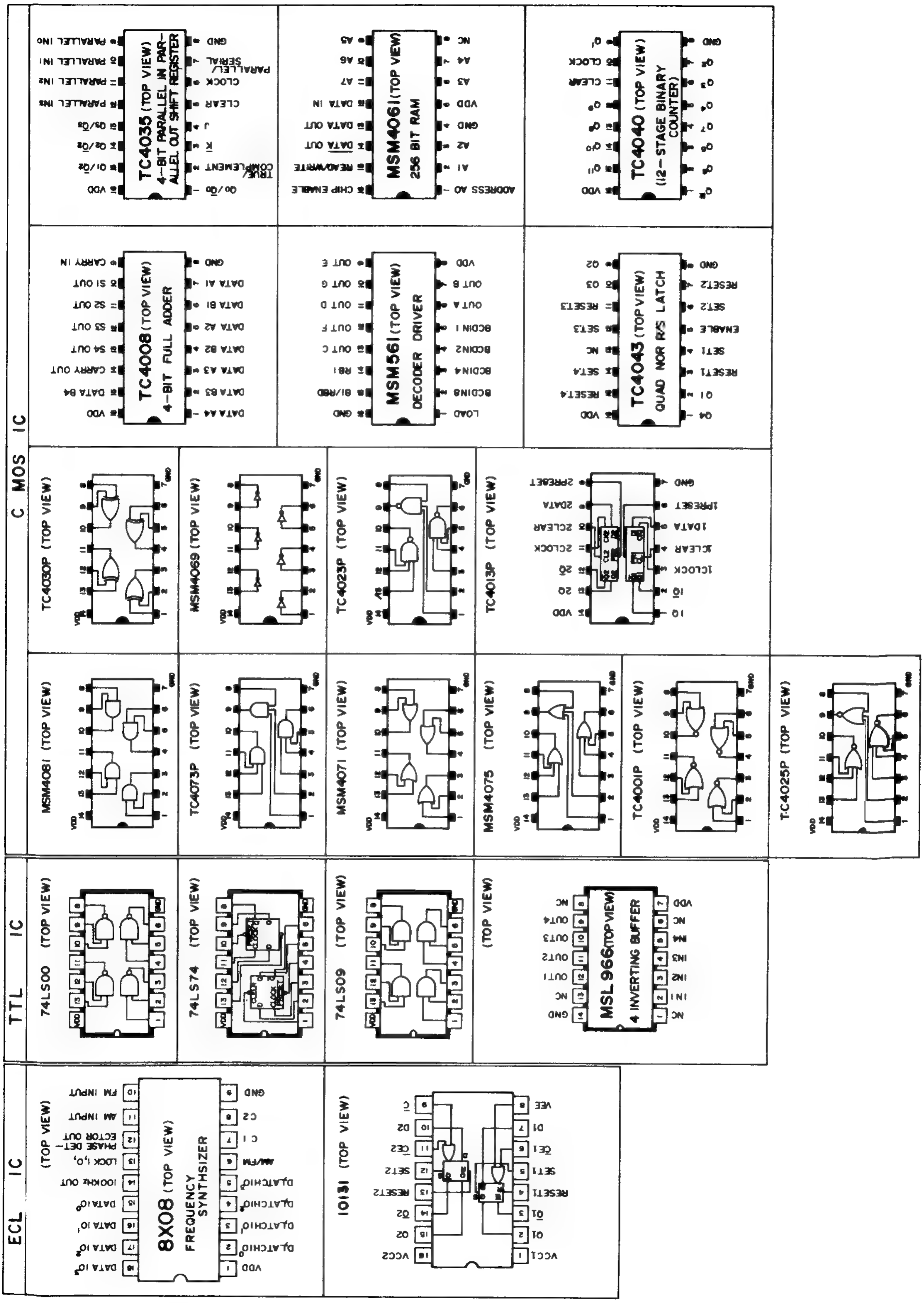
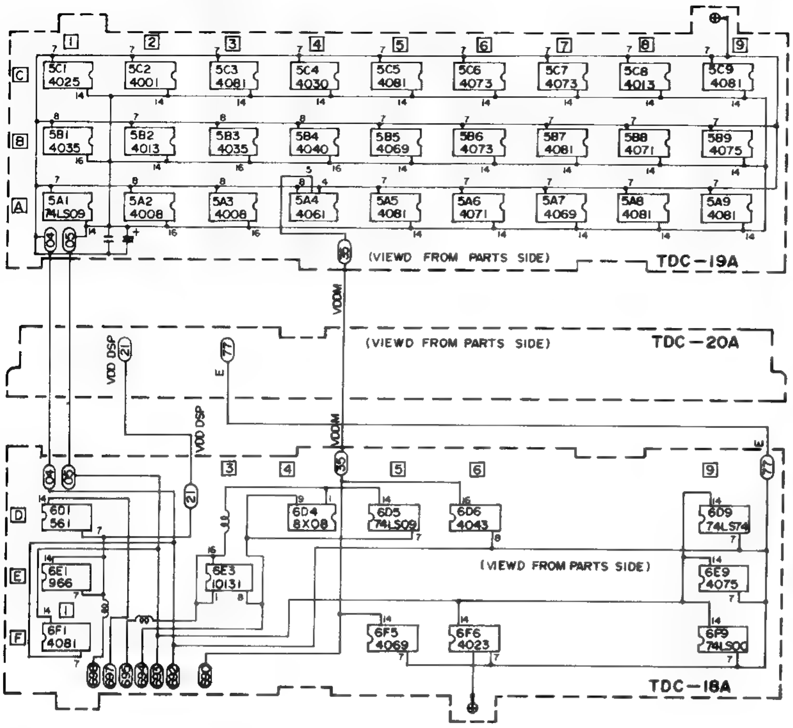


Fig. 17

11-(3) Bus Line Connection of Logic P.C. Boards

LOCATION OF LOGIC I C,S ON CIRCUIT BOARD AND CONNECTION OF POWER SUPPLY CIRCUIT

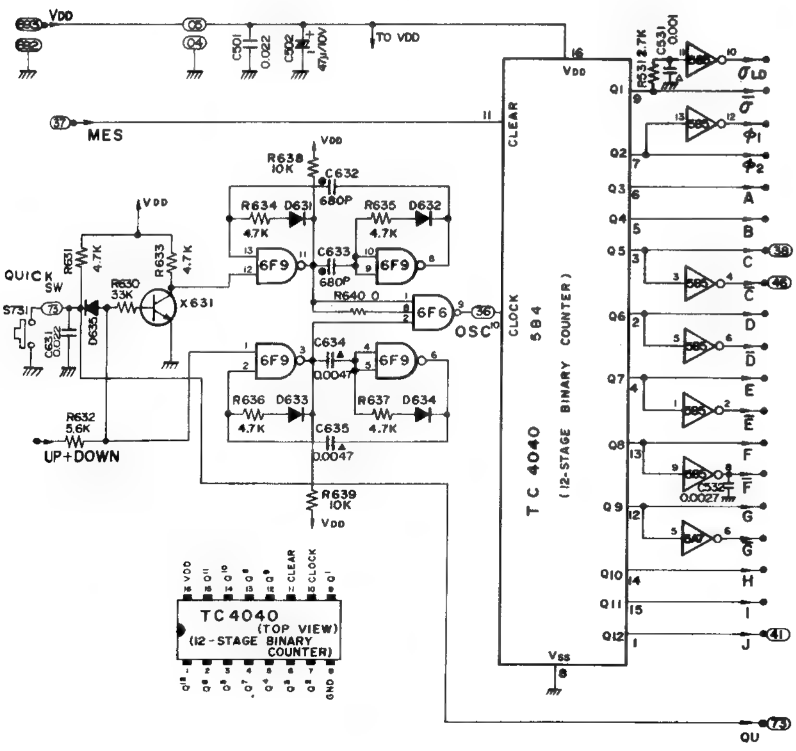


IC NAME	LOCATION	DESCRIPTION
10131	6E3	DUAL D-TYPE MASTER-SLAVE FLIP FLOP
8X08	6D4	FREQUENCY SYNTHESIZER
74LS00	6F9	QUAD 2-INPUT NAND GATE (TTL)
74LS09	5A1 , 6D5	OPEN C,QUAD 2IN,AND GATE(TTL)
74LS74	6D9	DUAL D-TYPE FLIP FLOP
MSM561	6D1	7-SEG,DECODER DRIVER
MSL966	6E1	QUAD INVERTING BUFFER
TC4001P	5C2	QUAD 2INPUT NOR GATE
MSM4008	5A2,5A3	4-BIT FULL ADDER
TC4013P	5C8 5B2	DUAL D-TYPE FLIP FLOP
TC4023P	6F6	TRIPLE 3-INPUT NAND GATE
TC4025P	5C1	TRIPLE 3-INPUT NOR GATE
TC4030P	5C4	QUAD EXCLUSIVE-OR GATE
TC4035P	5B1 ,5B3	4 BIT P-IN P-OUT SHIFT REGISTER
TC4040P	5B4	12 STAGE BINARY COUNTER
TC4043P	6D6	QUAD NOR R/S LATCH
MSM4061	5A4	256 BIT STATIC RAM
MSM4069	5B5 , 5A7 6F5	HEX INVERTER
MSM4071	5B8 5A6	QUAD 2-INPUT OR GATE
TC4073P	5C6 ,5C7 5B6	TRIPLE 3-INPUT AND GATE
MSM4075	5B9 , 6E9	TRIPLE 3-INPUT OR GATE
MSM4081P	5C3 ,5C5 5C9 ,5B7 5A5 ,6F1 5A9 , 5A8	QUAD 2-INPUT AND GATE

T.NO	SYMBOL	DESCRIPTION	CONNECTION
685	E (VDD25)	GRAND OF (VDD25)	TO TXX-76 301
686	VDD 25V	POWER SUPPLY FOR LOW PASS FILTER	" " 302
690	BATT IN	BATTRY POWER SUPPLY (6V)	" " 306
692	E (VDD)	GRAND OF (VDD)	" " 311
693	VDD	POWER SUPPLY FOR CONTROL LOGIC	" " 312
694	E (VDD SY)	GRAND OF (VDD SY)	" " 313
695	VDD SY	POWER SUPPLY FOR SYNTHESIZER	" " 314
697	E (VDD DSP)	GRAND OF (VDD SY)	" " 316
698	VDD DSP	POWER SUPPLY FOR DISPLAY	" " 317

Fig. 18

11-(4) Oscillators and Program Counter



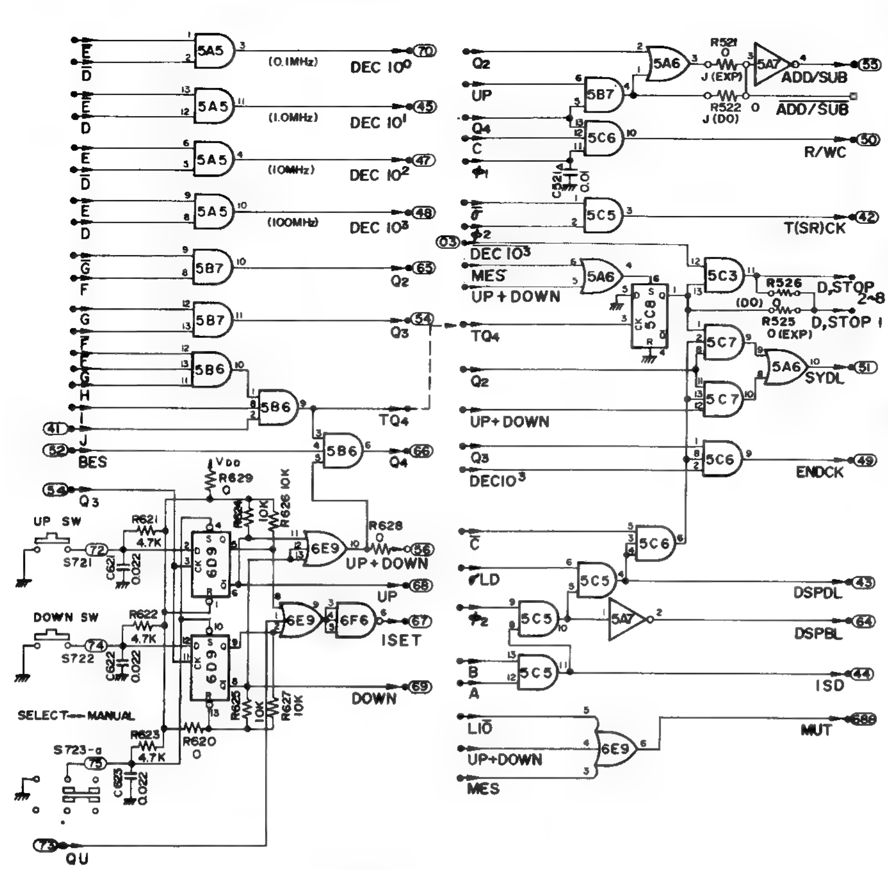
SYMBOL	DESCRIPTION	FROM SHEET
MES	MEMORY SELECT	11-(8)
ϕ_{LD}	BASE SIGNAL ϕ_{LD}	OUT
$\bar{\phi}$	" " $\bar{\phi}$	"
$\phi 1$	" " $\phi 1$	"
$\phi 2$	" " $\phi 2$	"
A	" " A	"
B	" " B	"
C	" " C	"
D	" " D	"
E	" " E	"
F	" " F	"
G	" " G	"
H	" " H	"
I	" " I	"
J	" " J	"
VDD DL	DELAYED POWER SUPPLY	11-(8)
QU	QUICK SWEEP	OUT

S731 ON		HIGH SPEED	O,S,C,
OFF		LOW SPEED	O,S,C,
IC	6F9	SN74LS00	QUAD 4 INPUT NAND GATE(TTL)
IC	6F6	TC4023	TRIPLE 3 INPUT NAND GATE
IC	5B4	TC4040	12-STAGE BINARY COUNTER
IC	5B5	MSM4069	HEX INVERTER
IC	5A7	MSM4069	HEX INVERTER
X	631	2SC458 (C)	
D 631~635		1S2076	

NON	MARK	CAPACITOR	50V CERAMIC
▲	"	"	50V MYLAR
±	"	"	E CAPACITOR
●	"	"	P.P CAPACITOR

Fig. 19

11-(5) UP/DOWN and Programable Logic Array



SYMBOL	DESCRIPTION	FROM SHEET
ADD/SUB	ADD OR SUBTRCT CONTROL	OUT
DEC 10^0	DECADE 0.1MHz CYCLE	"
DEC 10^1	DECADE 1.0MHz CYCLE	"
DEC 10^2	DECADE 10MHz CYCLE	"
DEC 10^3	DECADE 100MHz CYCLE	"
DOWN	DOWN COUNT SIGNAL	"
DSPDL	DISPLAY DATA LATCH	"
DSPBL	DISPLAY BLANK	"
ENDCK	BAND END CLOCK	"
BES	BAND END STOP	11-(6)
ISET	INITIAL SET	OUT
ISD	INITIAL DATA SET	"
$\overline{LIO}$	LOCK INDICATOR OUTPUT	11-(9)
MES	MEMORY CHANNEL SELECT	11-(8)
MUT	MUTING CONTROL	OUT
QU	QUICK SEEP	11-(4)
Q2	SYNTHESIZER DATA CYCLE	OUT
Q3	BAND END DETECT CYCLE	"
Q4	UP DOWN CYCLE	"
R/WC	READ OR WRITE CONTROL	"
T(SR)CK	STORE SHIFT REGISTER (5B1) CLOCK	"
SYDL	SYNTHESIZER DATA LATCH	"
UP	UP COUNT SIGNAL	"
UP+DOWN	UP DOWN SIGNAL	"
D, STOP 1	DATE STOP 1	"
D, STOP 2~8	DATA STOP 2~8	"

BASEC SIGNALS (σ_{LD}, $\bar{F}$, ϕ_1, ϕ_2, A~J) SHOWN AT SEET 1

IC	5A5, 5B7, 5C5	MSM4081	QUAD 2 INPUT AND GATE
IC	5B6, 5C6, 5C7	TC 4073	TRI, 3 INPUT AND GATE
IC	5A6	MSM4071	QUAD 2 INPUT OR GATE
IC	6E9	MSM4075	TRI, 3 INPUT OR GATE
IC	5A7	MSM4069	HEX INVERTER
IC	6F6	TC4023	TRI, 3 INPUT NAND GATE
IC	5C8	TC4013	DUAL "D" FLIP-FLOP
IC	6D9	74LS74	DUAL " " (TTL)

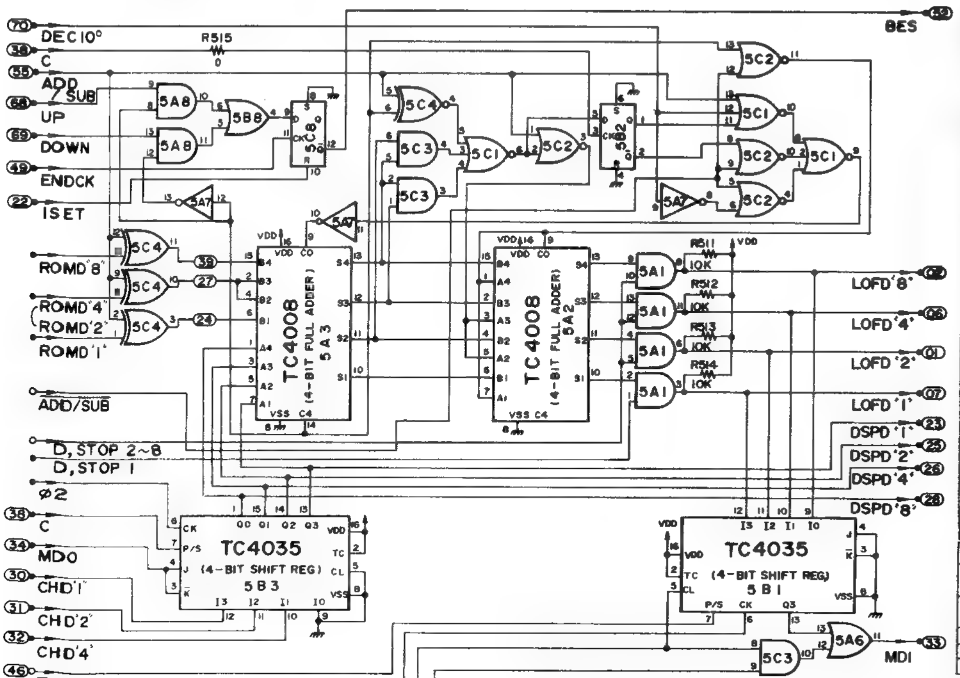
NON MARK CAPACITOR 50V CERAMIC (YZ)
△ " " 50V MYLAR (K)

NOTE

1) J (DO) ONLY DO USE
2) J (EXP) ONLY EXP USE (J, M, U, F, P, E, BS, A,)
   USE ONLY EXP MARKED PART FOR T-3030

Fig. 20

11-(6) Arithmetic Logic Unit



SYMBOL	DESCRIPTION	FROM SHEET
ADD/SUB	ADD OR SUBTRACK CONTROL	11-(5)
BES	BAND END STOP	OUT
C	BASIC SIGNAL C	11-(4)
$\overline{C}$	BASIC SIGNAL $\overline{C}$	11-(4)
ϕ_2	BASIC SIGNAL ϕ_2	11-(4)
CHD '4'	CH DATA '4'	11-(8)
CHD '2'	DATA '2'	11-(8)
CHD '1'	CH DATA '1'	11-(8)
DEC 10^0	DECADE 0.1MHz CYCLE	11-(5)
DEC 10^3	DECADE 100MHz CYCLE	11-(5)
DOWN	DOWN COUNT SIGNAL	11-(5)
DSP '8'	DISPLAY DATA '8'	OUT
DSP '4'	DISPLAY DATA '4'	"
DSP '2'	DISPLAY DATA '2'	"
DSP '1'	DISPLAY DATA '1'	"
ENDCK	BAND END CLOCK	11-(5)
ISD	INITIAL SET DATA	11-(5)
ISET	INITIAL SET	11-(5)
LOF D'8'	LOCAL OSC, FREQUENCY DATA '8'	OUT
LOF D'4'	LOCAL OSC, FREQUENCY DATA '4'	"
LOF D'2'	LOCAL OSC, FREQUENCY DATA '2'	"
LOF D'1'	LOCAL OSC, FREQUENCY DATA '1'	"
MDI	MEMORY DATA INPUT	"
MDO	MEMORY DATA OUT PUT	11-(8)
T(SR)CK	STORE SHIFT REGISTER CLOCK	11-(5)
UP	UP COUNT SIGNAL	11-(5)
ROM D'8'	ROM DATA '8'	11-(7)
ROM D'4'	ROM DATA '4'	11-(7)
ROM D'2'	ROM DATA '2'	11-(7)
ROM D'1'	ROM DATA '1'	11-(7)
D, STOP 1	DATA STOP 1	11-(5)
D, STOP 2~8	DATA STOP 2~8	11-(5)

SYMBOL	TIMING
ADD/SUB	(Add = "L", SUB = "H") Add = UP (ONLY DO USE); Add = UP+Q2 (ONLY EXP USE)
ENDCK	$\overline{C} \cdot B \cdot A \cdot \phi_2 \cdot \sigma_{LD} \cdot Q3 \cdot 10^3$
ISD	B·A
ISET	UP·DOWN·QU
T(SR)CK	$\phi_2 \cdot \bar{F}$

IC	5A8, 5C3	MSM4081	4-2 IN, AND GATE
IC	5B8, 5A6	MSM4071	4-2 IN, OR GATE
IC	5C2	TC 4001	4-2 IN, NOR GATE
IC	5C1	TC 4025	3-3 IN, NOR GATE
IC	5A7	MSM4069	6 - INVERTER
IC	5C4	TC 4030	2-4 IN, EXCLUSIVE OR

IC	5A1	74LS09	OPEN C, AND GATE
IC	5C8	TC4013	2- "D" FLIP, FLOP

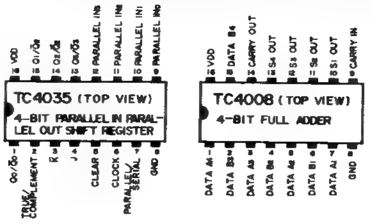
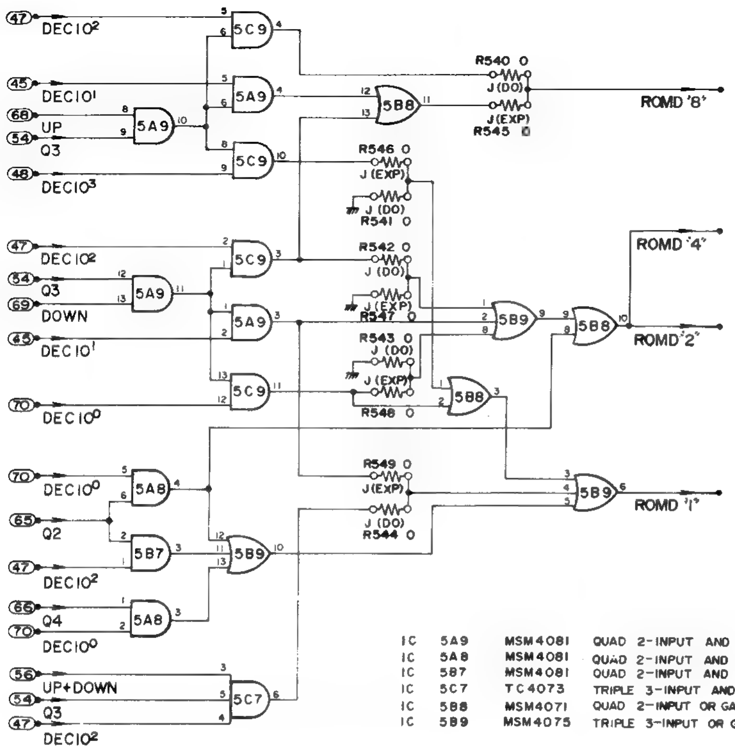


Fig. 21

11-(7) Read Only Memory



IC	5A9	MSM4081	QUAD 2-INPUT AND GATE
IC	5A8	MSM4081	QUAD 2-INPUT AND GATE
IC	5B7	MSM4081	QUAD 2-INPUT AND GATE
IC	5C7	TC4073	TRIPLE 3-INPUT AND GATE
IC	5B8	MSM4071	QUAD 2-INPUT OR GATE
IC	5B9	MSM4075	TRIPLE 3-INPUT OR GATE

SYMBOL	DESCRIPTION	FROM SHEET
DEC 10^0	DECADE 0.1MHz CYCLE	11-(5)
DEC 10^1	DECADE 1.0MHz CYCLE	11-(5)
DEC 10^2	DECADE 10MHz CYCLE	11-(5)
DEC 10^3	DECADE 100MHz CYCLE	11-(5)
Q2	SYNTHESIZER DATA CYCLE	11-(5)
Q3	BAND END DETECT CYCLE	11-(5)
Q4	UP DOWN CYCLE	11-(5)
UP	UP COUNT SIGNAL	11-(5)
DOWN	DOWN COUNT SIGNAL	11-(5)
UP+DOWN	UP DOWN SIGNAL	11-(5)
ROMD '8'	ROM DATA '8'	OUT
ROMD '4'	ROM DATA '4'	"
ROMD '2'	ROM DATA '2'	"
ROMD '1'	ROM DATA '1'	"

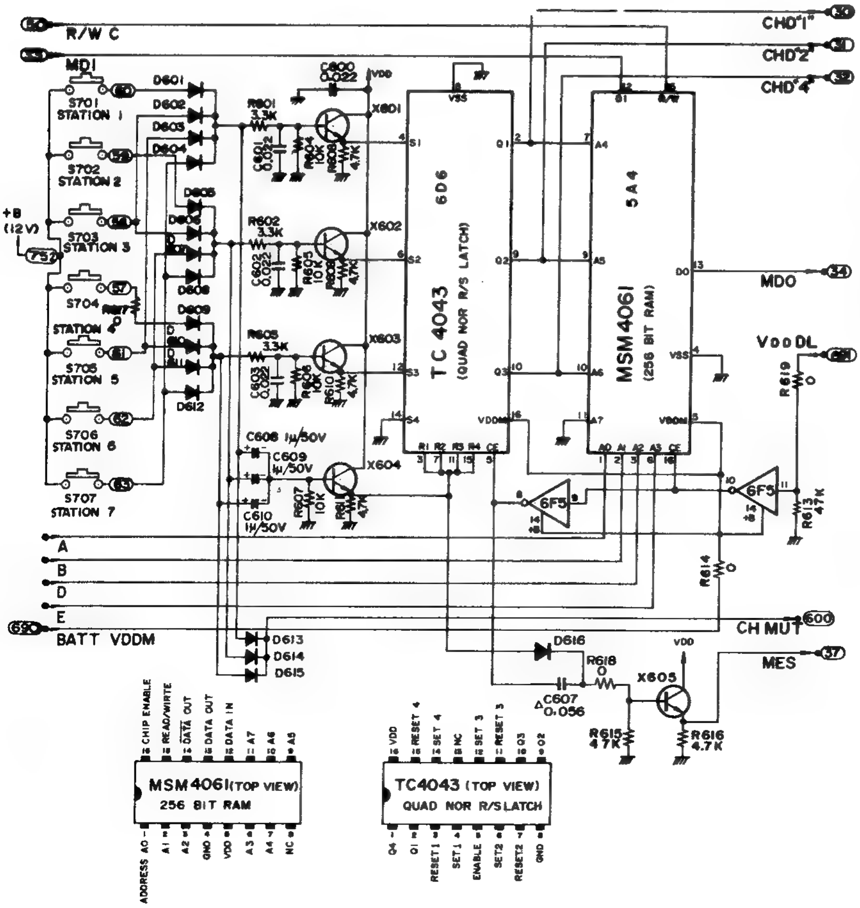
	DO (USE)		EXP (USE)	
	ROMD "8" "4" "2" "1"		ROMD "8" "4" "2" "1"	
Q2 · 10^0	7	0 1 1 1	7	0 1 1 1
Q2 · 10^1	0	0 0 0 0	0	0 0 0 0
Q2 · 10^2	1	0 0 0 1	1	0 0 0 1
Q2 · 10^3	0	0 0 0 0	0	0 0 0 0
UP · Q3 · 10^0	0	0 0 0 0	0	0 0 0 0
UP · Q3 · 10^1	0	0 0 0 0	8	1 0 0 0
UP · Q3 · 10^2	9	1 0 0 1	0	0 0 0 0
UP · Q3 · 10^3	0	0 0 0 0	1	0 0 0 1
DOWN · Q3 · 10^0	1	0 0 0 1	7	0 1 1 1
DOWN · Q3 · 10^1	6	0 1 1 0	7	0 1 1 1
DOWN · Q3 · 10^2	7	0 1 1 1	8	1 0 0 0
DOWN · Q3 · 10^3	0	0 0 0 0	0	0 0 0 0
Q4 · 10^0	1	0 0 0 1	1	0 0 0 1
Q4 · 10^1	0	0 0 0 0	0	0 0 0 0
Q4 · 10^2	0	0 0 0 0	0	0 0 0 0
Q4 · 10^3	0	0 0 0 0	0	0 0 0 0

NOTE

1) J (DO) ONLY DO USE
2) J (EXP) ONLY EXP USE (J, M, U, F, P, E, BS, A)
USE ONLY EXP MARKED PART FOR T-3030

Fig. 22

11-(8) Channel Select and Memory



SYMBOL	DESCRIPTION	FORM SHEET
A	BASIC TIMING A	11-(4)
B	BASIC TIMING B	11-(4)
D	BASIC TIMING D	11-(4)
E	BASIC TIMING E	11-(4)
MDI	MEMORY DATA INPUT	11-(6)
MDO	MEMORY DATA OUTPUT	OUT
R/WC	READ OR WRITE CONTROL	11-(5)
ISYL	INITIAL SYNTHESIZER LATCH	OUT
MES	MEMORY SELECT	"
CHD "1"	CHANNEL DATA "1"	"
CHD "2"	CHANNEL DATA "2"	"
CHD "4"	CHANNEL DATA "4"	"
BATT VDDM	BATTERY POWER SUPPLY (6V)	BATTERY
VDD	POWER SUPPLY (5V)	POWER CB
VDD DL	DELAYED POWER SUPPLY	OUT
CH MUT	CHANNEL MUTING	OUT

R/WC = Q4 · C · φ1

IC	6D6	TC4043	QUAD NOR R/S LATCH
IC	5A4	MSM4061	256BIT RAM
IC	6F5	MSM4069	HEX INVERTER

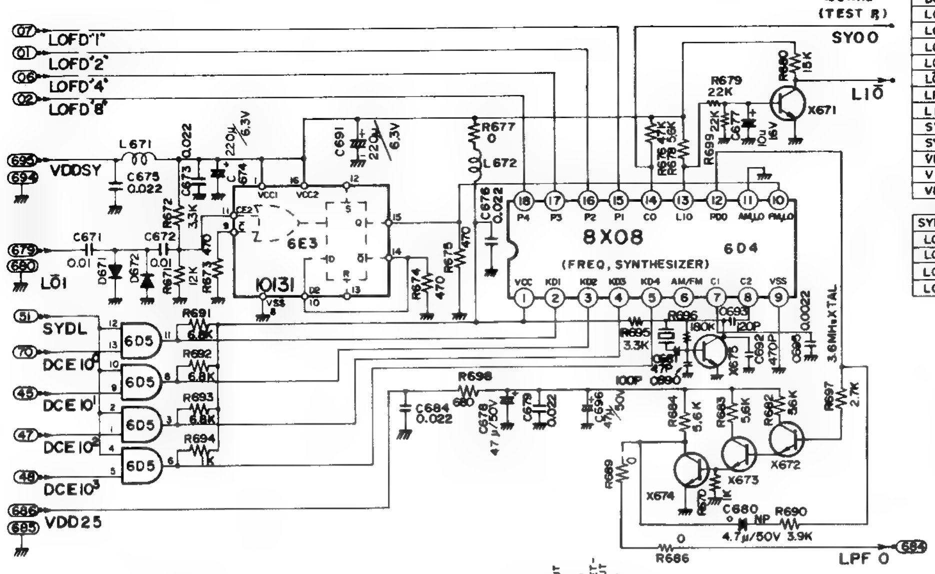
D601 ~ D616 1S2076

X601 ~ X605 2SC458 (C)

NON	MARK	CAPACITOR	50V CERAMIC (YZ)
⊣⊢	"	"	E CAPACITOR (A)
△	"	"	50V MYLAR (K)

Fig. 23

11-(9) Synthesizer



SYMBOL	DESCRIPTION	FROM SHEET
DCE 10^0	DECADE 0.1MHz CYCLE	11-(5)
DCE 10^1	DECADE 1.0MHz CYCLE	11-(5)
DCE 10^2	DECADE 10MHz CYCLE	11-(5)
DCE 10^3	DECADE 100MHz CYCLE	11-(5)
LOF D'1'	LOCAL OSC, FREQUENCY DATA1	11-(6)
LOF D'2'	LOCAL OSC, FREQUENCY DATA2	11-(6)
LOF D'4'	LOCAL OSC, FREQUENCY DATA4	11-(6)
LOF D'8'	LOCAL OSC, FREQUENCY DATA8	11-(6)
$\overline{LO}I$	LOCAL OSC, INPUT	FRONT END
LPF O	LPF OUTPUT	OUT
$LI\overline{O}$	LOCK INDICATOR OUTPUT	"
SYO O	SYNTHESIZER OSC OUTPUT(100KHz)	"
SY DL	SYNTHESIZER DATA LATCH	11-(5)
VDD	POWER SUPPLY 5V	
VDDSY	POWER SUPPLY FOR SYNTHESIZER	
VDD25V	POWER SUPPLY FOR LPF 25V	

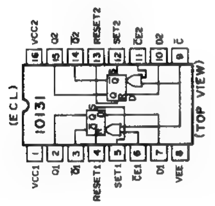
SYMBOL	PIGHT DATA TIME
LOFD'8'	$T = C \cdot B \cdot A \cdot \phi_2 + C \cdot \overline{B} \cdot \overline{A} \cdot \phi_1$
LOFD'4'	$T = C \cdot B \cdot A \cdot \phi_2 + C \cdot \overline{B} \cdot \overline{A} \cdot \phi_1$
LOFD'2'	$T = C \cdot B \cdot A \cdot \phi_2 + C \cdot \overline{B} \cdot \overline{A} \cdot \phi_1$
LOFD'1'	$T = C \cdot B \cdot A \cdot \phi_2 + C \cdot \overline{B} \cdot \overline{A} \cdot \phi_1$

SYDL = $C \cdot B \cdot A \cdot \phi_2 \cdot \sigma$LD Q2 (UP+DOWN)
+$C \cdot B \cdot A \cdot \phi_2 \cdot \sigma$LD Q2 (POWER ON)

IC	6E3	10131	DUAL'D'TYPE FLIP FLOP
IC	6D4	8X18	FREQUENCY SYNTHESIZER

X672 , X673	2SC1775AV(F)
X671 , X674	2SC458(C)
D101 ~ D102	1S2076

NON	MARK	CAPACITOR	50V CERAMIC (YZ)
⊣■⊢	"	"	E CAPACITOR
○	"	"	NON POLE E CAP.



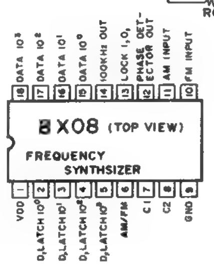
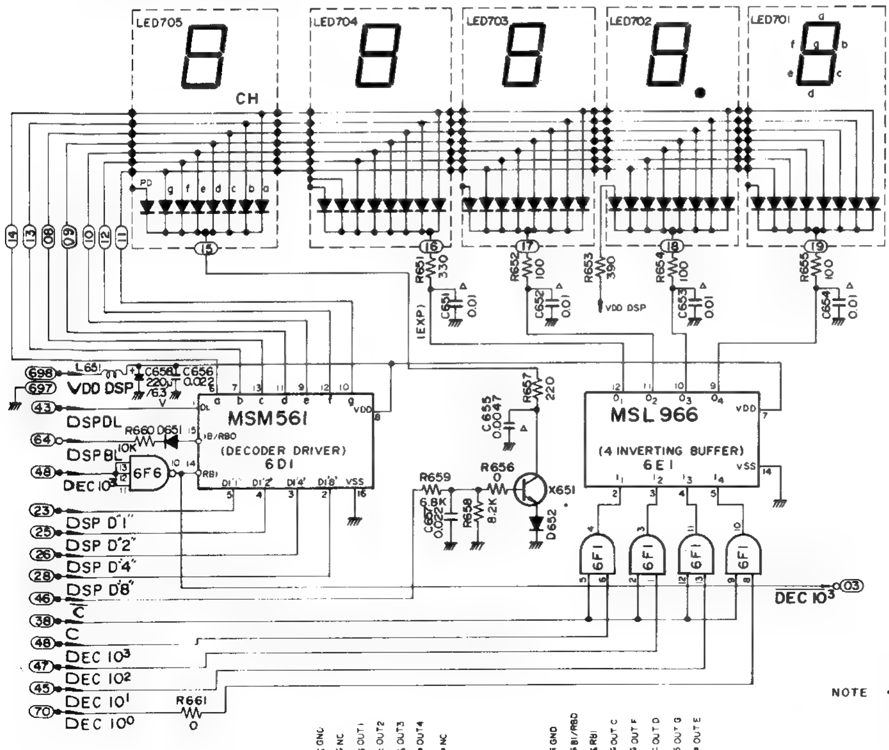


Fig. 24

11-(10) Displays



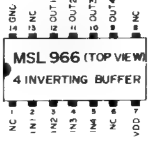
SYMBOL	DESCRIPTION	FROM SHEET
C	BASE SIGNAL C	11-(4)
$\overline{C}$	BASE SIGNAL C	11-(4)
DEC 10^0	DECADE 0.1MHz CYCLE	11-(5)
DEC 10^1	DECADE 1.0MHz CYCLE	11-(5)
DEC 10^2	DECADE 10MHz CYCLE	11-(5)
DEC 10^3	DECADE 100MHz CYCLE	11-(5)
DSP D'1'	DISPLAY DATA '1'	11-(6)
DSP D'2'	DISPLAY DATA '2'	11-(6)
DSP D'4'	DISPLAY DATA '4'	11-(6)
DSP D'8'	DISPLAY DATA '8'	11-(6)
DSPDL	DISPLAY DATA LATCH	11-(5)
DSPBL	DISPLAY BLANK	11-(5)
VDD DSP	POWER SUPPLY FOR DISPLAY	

INPUT SIGNAL TIMING ('H' LEVEL TIME)
• DSPDL = $\overline{B \cdot A \cdot \phi_2} \cdot \sigma$LD
• DSPBL = $B \cdot A \cdot \phi_2$

IC	6D1	MSM561	7SEG,DECODER DRIVER
IC	6E1	MSL966	4-INVERTING BUFFER
IC	6F6	TC4023	3-3IN, NAND GATE
IC	6F1	TC4081	QUAD 4-INPUT AND GATE
LED701 ~ LED705		7 SEGMENT LED	
X651		2SC1904(V)	
D651 D652		1S2076	

NON	MARK	CAPACITOR	50V CERAMIC(YZ)
⊣■⊢	"	"	E CAPACITOR(A)
Δ	"	"	50V MYLAR (K)

NOTE • SIGNAL (DSP D'1' ~ DSP D'4') SHOW SELECTED CHANNEL DATA AT THE TIME (T=C) AND SHOW LOCAL OSC FREQUENCY DATA AT THE TIME ($T = C \cdot B \cdot A \cdot \phi_2 + C \cdot B \cdot A \cdot \phi_2$)



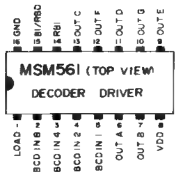
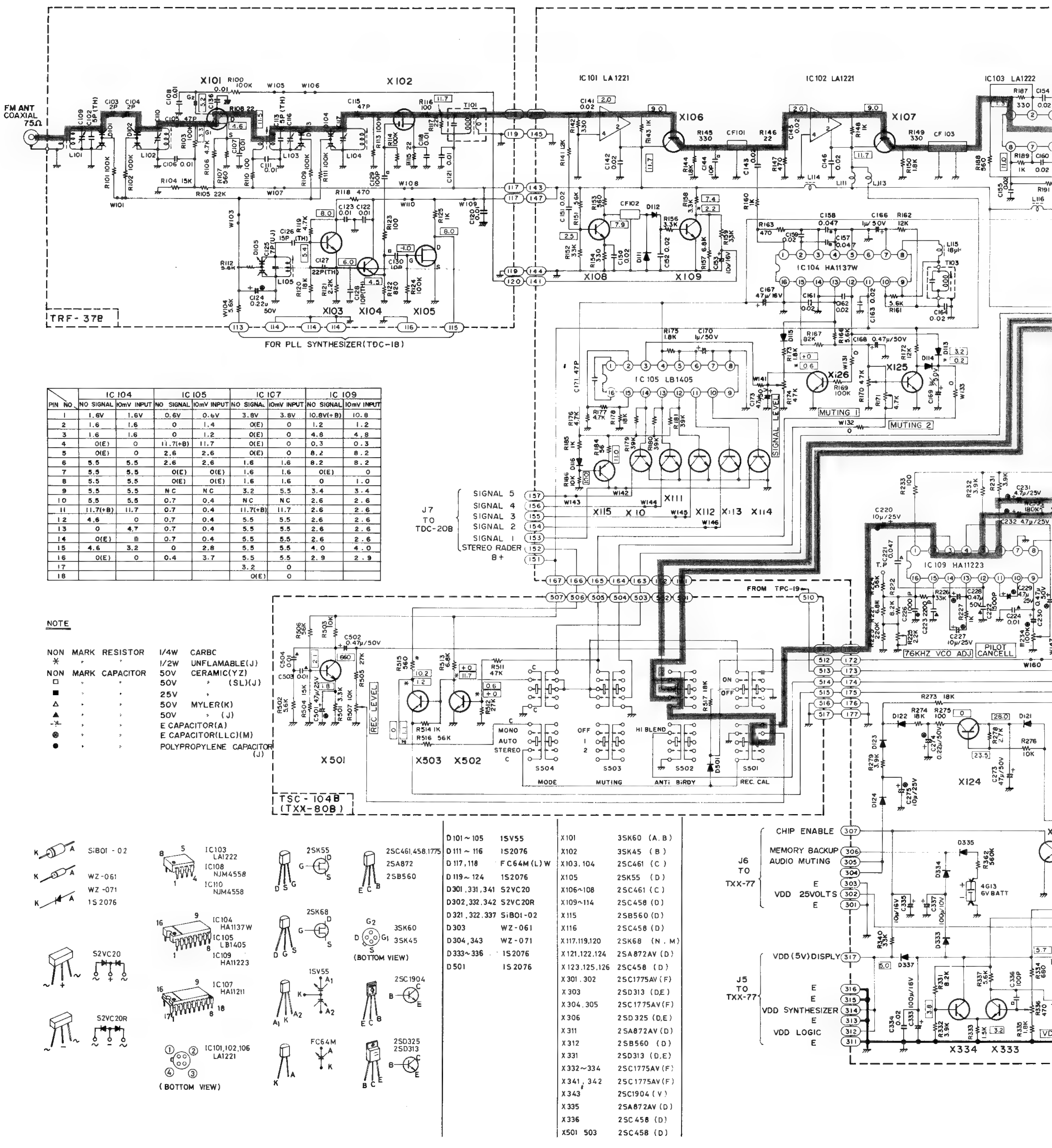


Fig 25

11-(11) Tuner



PIN NO	IC 104 NO SIGNAL	IC 104 10mV INPUT	IC 105 NO SIGNAL	IC 105 10mV INPUT	IC 107 NO SIGNAL	IC 107 10mV INPUT	IC 109 NO SIGNAL	IC 109 10mV INPUT
1	1.6V	1.6V	0.6V	0.6V	3.8V	3.8V	10.8V(+B)	10.8
2	1.6	1.6	0	1.4	0(E)	0	1.2	1.2
3	1.6	1.6	0	1.2	0(E)	0	4.8	4.8
4	0(E)	0	11.7(+B)	11.7	0(E)	0	0.3	0.3
5	0(E)	0	2.6	2.6	0(E)	0	8.2	8.2
6	5.5	5.5	2.6	2.6	1.6	1.6	8.2	8.2
7	5.5	5.5	0(E)	0(E)	1.6	1.6	0(E)	0
8	5.5	5.5	0(E)	0(E)	1.6	1.6	0	1.0
9	5.5	5.5	NC	NC	3.2	5.5	3.4	3.4
10	5.5	5.5	0.7	0.4	NC	NC	2.6	2.6
11	11.7(+B)	11.7	0.7	0.4	11.7(+B)	11.7	2.6	2.6
12	4.6	0	0.7	0.4	5.5	5.5	2.6	2.6
13	0	4.7	0.7	0.4	5.5	5.5	2.6	2.6
14	0(E)	[illegible]	0.7	0.4	5.5	5.5	2.6	2.6
15	4.6	3.2	0	2.8	5.5	5.5	4.0	4.0
16	0(E)	0	0.4	3.7	5.5	5.5	2.9	2.9
17					3.2	0		
18					0(E)	0		

NOTE

NON MARK RESISTOR		1/4W	CARBC
*		1/2W	UNFLAMABLE(J)
NON MARK CAPACITOR		50V	CERAMIC(YZ)
□		50V	〃 (SL)(J)
■		25V	〃
△		50V	MYLER(K)
▲		50V	〃 (J)
			E CAPACITOR(A)
⊛			E CAPACITOR(LLC)(M)
●			POLYPROPYLENE CAPACITOR(J)

D101 ~ 105	1SV55
D111 ~ 116	1S2076
D117, 118	FC64M(L)W
D119 ~ 124	1S2076
D301, 331, 341	S2VC20
D302, 332, 342	S2VC20R
D321, 322, 337	SiB01-02
D303	WZ-061
D304, 343	WZ-071
D333 ~ 336	1S2076
D501	1S2076

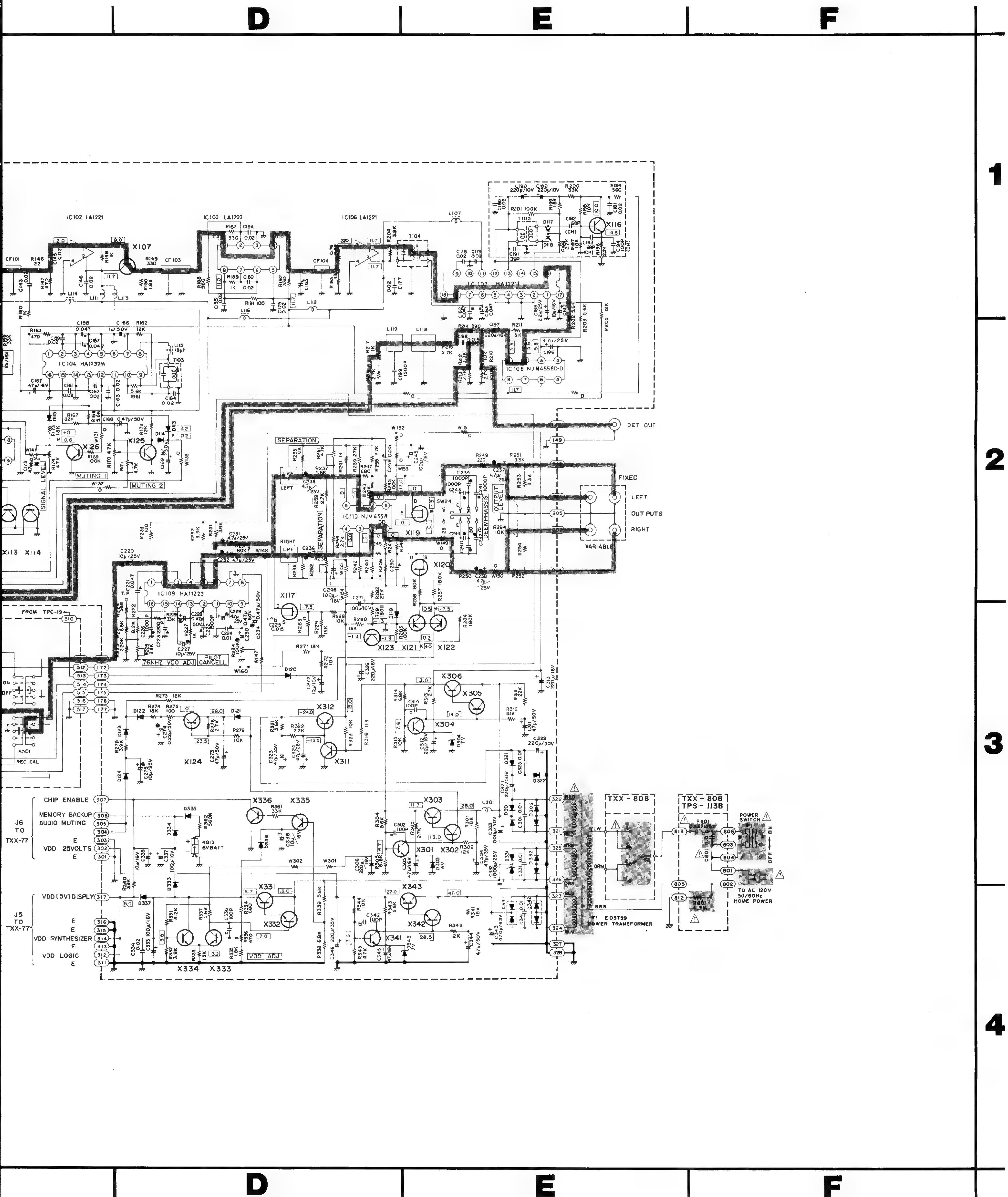
X101	3SK60 (A. B)
X102	3SK45 (B)
X103, 104	2SC461 (C)
X105	2SK55 (D)
X106~108	2SC461 (C)
X109~114	2SC458 (D)
X115	2SB560 (D)
X116	2SC458 (D)
X117, 119, 120	2SK68 (N, M)
X121, 122, 124	2SA872AV (D)
X123, 125, 126	2SC458 (D)
X301, 302	2SC1775AV (F)
X303	2SD313 (D,E)
X304, 305	2SC1775AV (F)
X306	2SD325 (D,E)
X311	2SA872AV (D)
X312	2SB560 (D)
X331	2SD313 (D,E)
X332~334	2SC1775AV (F)
X341, 342	2SC1775AV (F)
X343	2SC1904 (V)
X335	2SA872AV (D)
X336	2SC458 (D)
X501 503	2SC458 (D)

Printed Circuit Board Ass'y Locations

P.C. Board Ass'y	Description	Page
TRF-37B, C	Frontend P.C. Board Ass'y	22
TXX-76A	Tuner P.C. Board Ass'y	24
TDC-18B	Synthesizer P.C. Board Ass'y	32
TDC-19B	Control Logic P.C. Board Ass'y	36

P.C. Board Ass'y	Description	Page
TDC-20B	Front Panel P.C. Board Ass'y	37
TSC-104B, C, D	Switches P.C. Board Ass'y	38
TPS-113B, C, D	Primary Power P.C. Board Ass'y	39
TXX-80-3B, 3C, 3D	Voltage Selector	39

Notes:
1. ☐ shows DC voltage to the chassis
2. * ☐ shows DC voltage to the c
antenna input applied.
3. Voltage values in ☐ are positive.
4. Voltage values in ☐ are negative.
5. —— indicates positive B power suppl
6. —— indicates negative B power suppl
7. ▬ indicates signal path.



Notes:
1. ☐ shows DC voltage to the chassis with no signal input.
2. * ☐ shows DC voltage to the chassis when 10 mV antenna input applied.
3. Voltage values in ☐ are positive.
4. Voltage values in ☐ are negative.
5. —— indicates positive B power supply.
6. —— indicates negative B power supply.
7. ▬ indicates signal path.
8. When replacing the parts in the darkened area (▬) and those marked with ⚠, be sure to use the designated parts to ensure safety.
9. Parts in red indicate transistors or ICs.
10. This is the standard circuit diagram. The design and contents are subject to change without notice.

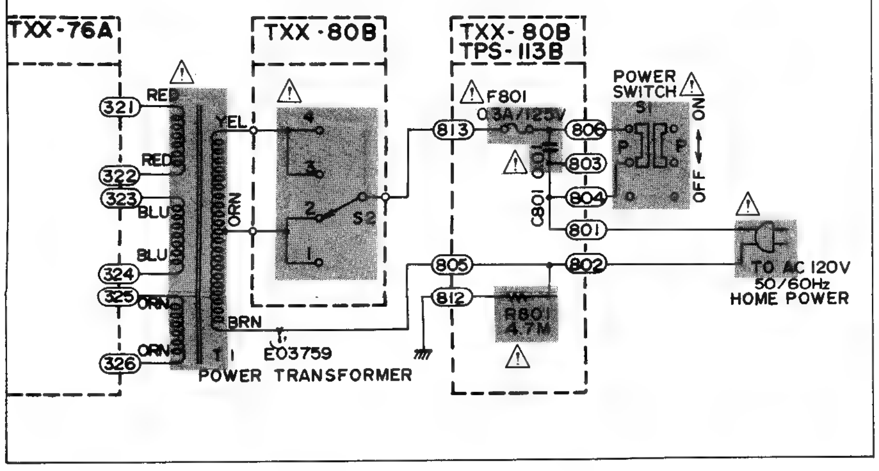
Fig. 26

11-(12) Settings for Designated Areas

The schematic diagram shown seet] is for the U.S.A
The primary circuit and deemphasis circuit are different from the diagram for other areas, therefore please use the proper schematic diagram shown below.

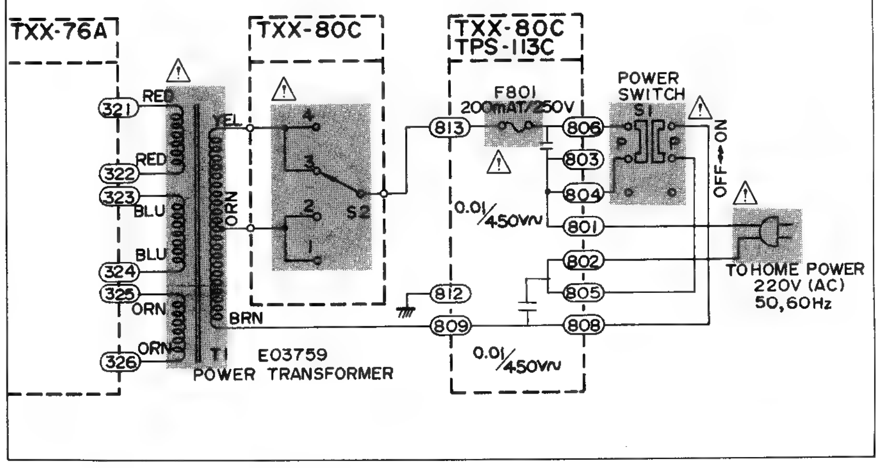
T-3030 (J) FOR U.S.A.,(C) FOR CANADA

PRIMARY CIRCUIT : SELECTABLE 110/120/220/240V 50/60Hz
DEEMPHASIS : SW (S241) SET FOR 75μSEC.
VOLTAGE SELECTOR (S2 MOUNTED ON THE REAR PANEL)
IS SET FOR 120V~ HOME POWER.



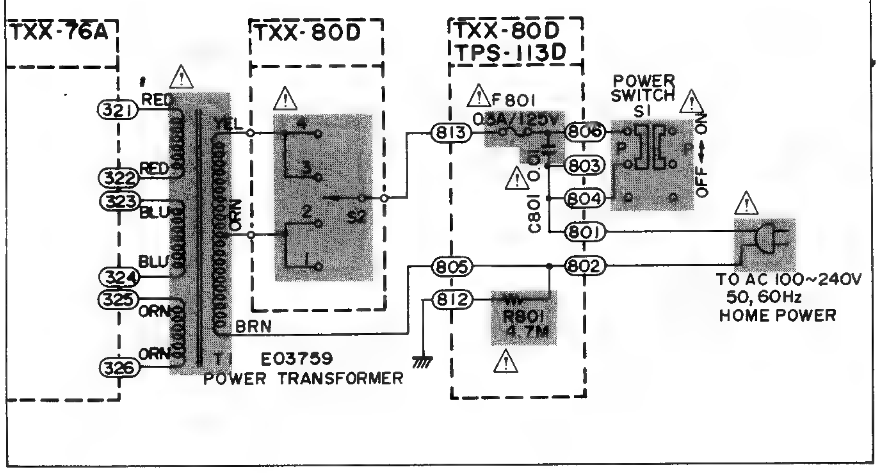
T-3030 (E) FOR EUROPE

PRIMARY CIRCUIT : SELECTABLE AC 110/120/220/240V ~ 50Hz
DEEMPHASIS : SW (S241) SET FOR 50μSEC.
VOLTAGE SELECTOR (S2 MOUNTED ON THE REAR PANEL)
IS SET FOR 220V~ HOME POWER.



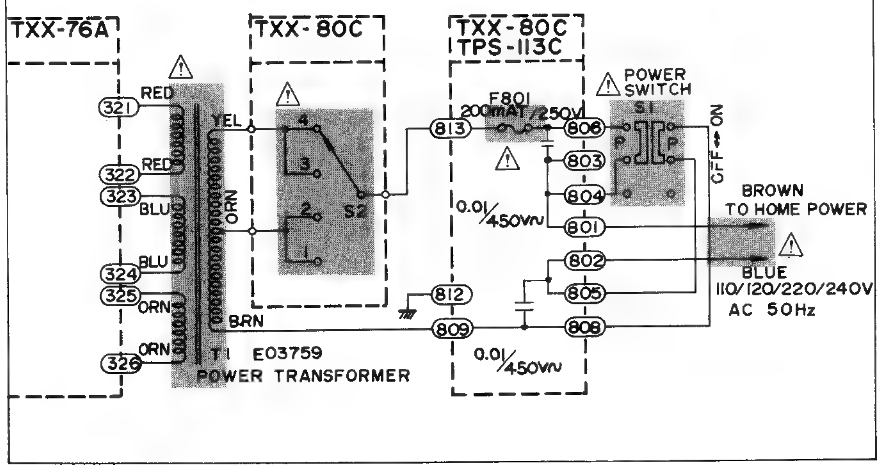
T-3030 (U) FOR THE UNIVERSAL USE

PRIMARY CIRCUIT : SELECTABLE 110/120/220/240V~ 50/60Hz
DEEMPHASIS : SW (S241) SET FOR 50μSEC.
VOLTAGE SELECTOR (S2 MOUNTED ON THE REAR PANEL)
MUST BE ADJUSTED FOR THE PROPER VOLTAGE OF HOME POWER.



T-3030 (BS) FOR UNITED KINGDAM

PRIMARY CIRCUIT : SELECTABLE AC 110/120/220/240V 50Hz
DEEMPHASIS : SW (S241) SET FOR 50μSEC.



T-3030 (P) FOR PACEX AND NEX USE

PRIMARY CIRCUIT : SELECTABLE 110/120/220/240V~ 50/60Hz
DEEMPHASIS : SW (S241) SET FOR 75μSEC.
VOLTAGE SELECTOR (S2 MOUNTED ON THE REAR PANEL)
MUST BE ADJUSTED FOR THE PROPER VOLTAGE OF HOME POWER.

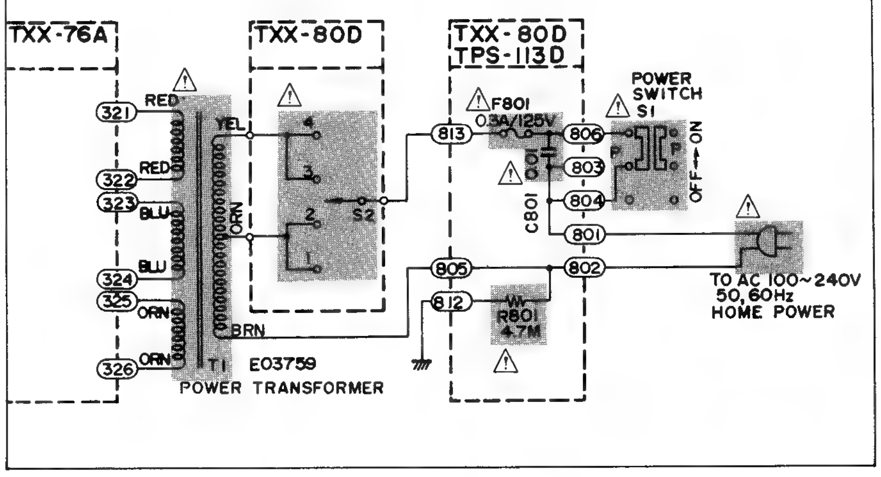


Fig. 27

11-(13) Inter Connection of Each P.C. Board

THIS SCHEMATIC DIAGRAM SHOWS THE INTERCONNECTION OF EACH CIRCUIT BOARD.

NOTE
(1) MARK SHOWS OUTPUT SIGNAL
(2) MARK SHOWS INPUT SIGNAL

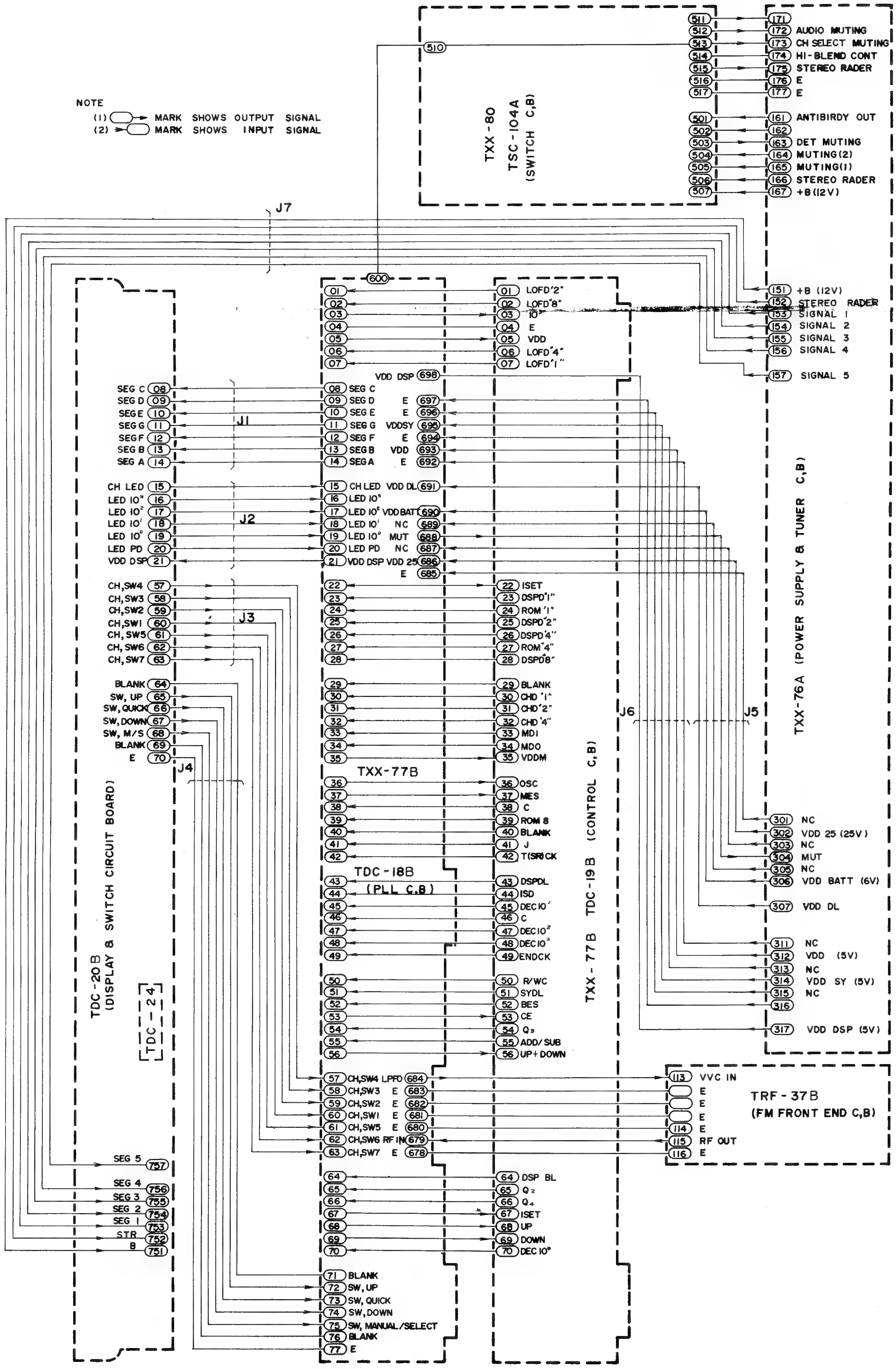


Fig. 28

12. Printed Circuit Board Ass'y and Parts List

12-(1) TRF-37B, C Frontend P.C. Board Ass'y

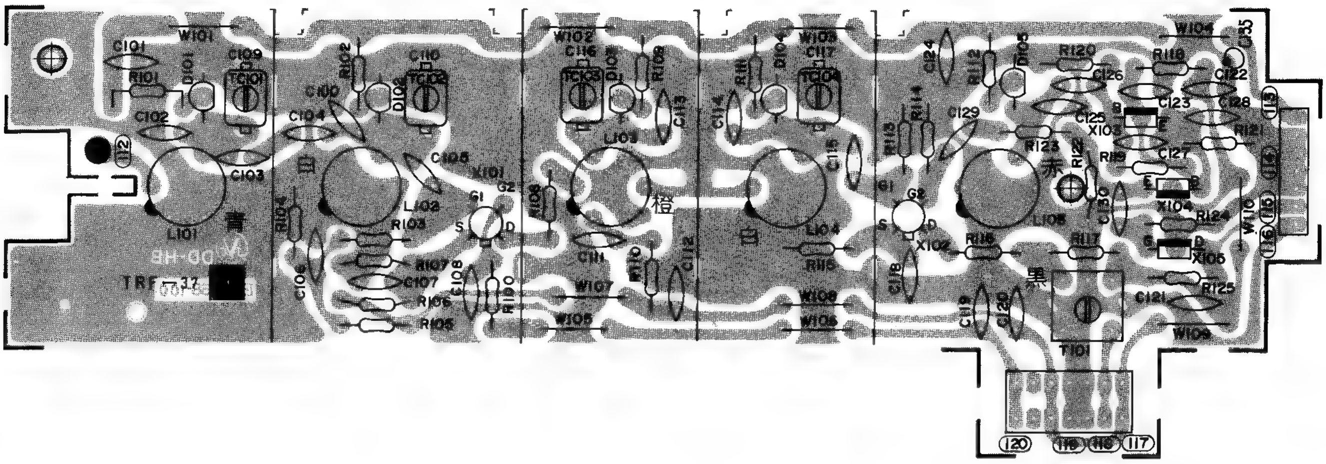


Fig. 29

Transistors

Item No.	Part Number	Rating		Description	Maker
		Pc	fT		
X101	3SK60	0.33 W		F.E.T.	Hitachi
X102	3SK45 (B)	〃		〃	〃
X103	2SC461 (C)	0.2 W	230 MHz	Silicon	〃
X104	2SC461 (C)	〃	〃	〃	〃
X105	2SK55 (D)	0.25 W	100 MHz	F.E.T.	〃

Diodes

Item No.	Part Number	Rating	Description	Maker
D101	1SV55		Variable Capacitance	Hitachi
D102	1SV55		〃	〃
D103	1SV55		〃	〃
D104	1SV55		〃	〃
D105	1SV55		〃	〃

Coils & Transformers

Item No.	Part Number	Rating	Description
L101	E03477-047		ANT. 1 (Blue)
L102	E03477-048		ANT. 2 (White)
L103	E03477-049		RF 1 (Orange)
L104	E03477-048		RF 2 (White)
L105	E03477-050		OSC. (Red)
T101	E03078-39	10.7 MHz	IFT (Black)

Capacitors

Item No.	Part Number	Rating		Description
C102	QCT05TH-5RO	5 pF	50 V	Ceramic, Temperature Compensate
C103	QCS31HJ-2RO	2 pF	〃	Ceramic
C104	QCS31HJ-2RO	〃	〃	〃
C105	QCS31HJ-470	47 pF	〃	〃
C106	QCF31HP-103	0.01 μF	〃	〃
C107	QCF31HP-103	〃	〃	〃
C108	QCF31HP-103	〃	〃	〃
C109	QAT2001-001			Trimmer TC101 ANT. 1
C110	QAT2001-001			Trimmer TC102 ANT. 2
C111	QCF31HP-103U	0.01 μF	50 V	Ceramic

Capacitors

Item No.	Part Number	Rating		Description
C113	QCT05TH-5RO	5 pF	50 V	Ceramic
C115	QCS31HJ-470	47 pF	"	"
C116	QAT2001-001			Trimmer TC103 RF 1
C117	QAT2001-001			Trimmer TC104 RF2
C118	QCF31HP-103U	0.01 μF	50 V	Ceramic
C120	QCF31HP-103	"	"	"
C121	QCF31HP-103	"	"	"
C122	QCF31HP-103	"	"	"
C123	QCF31HP-103U	"	"	"
C124	QEB51HM-224	0.22 μF	"	Low Leak Current Electrolytic
C125	QCT05UJ-7RO	7 pF	"	Ceramic, Temparature Compensate
C126	QCT05TH-150	15 pF	"	"
C127	QCT05TH-220	22 pF	"	"
C128	QCT05TH-100	10 pF	"	"
C129	QCS31HJ-101	100 pF	"	Ceramic
C130	QCS31HJ-100	10 pF	"	"
C136	QCF31HP-103	0.01 μF	"	"

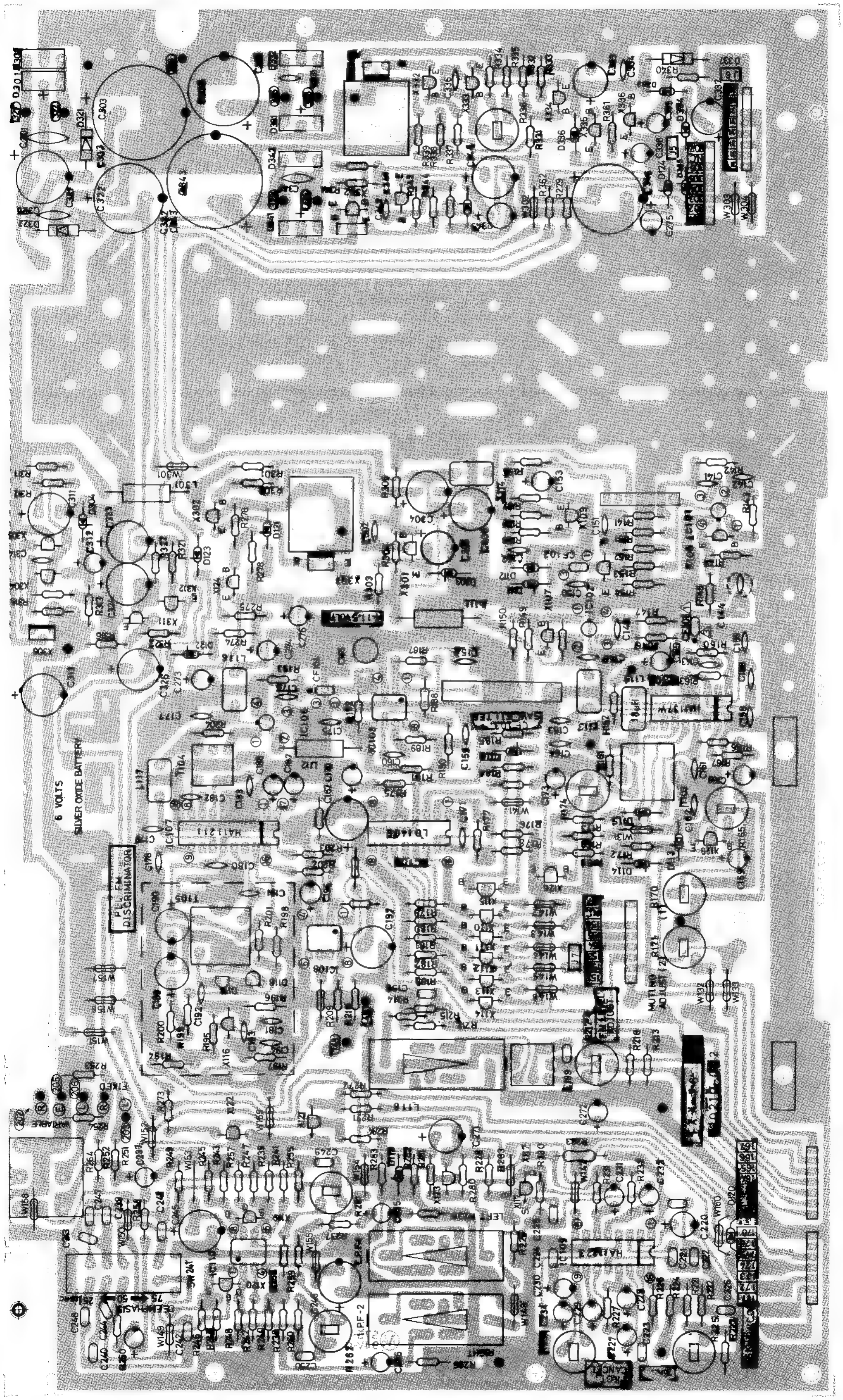
Resistors

Item No.	Part Number	Rating		Description
R100	QRD141J-104S	100 kΩ	1/4 W	Carbon
R101	QRD141J-104S	"	"	"
R102	QRD141J-104S	"	"	"
R103	QRD141J-104S	"	"	"
R104	QRD141J-153S	15 kΩ	"	"
R105	QRD141J-223S	22 kΩ	"	"
R106	QRD141J-472S	4.7 kΩ	"	"
R107	QRD141J-561S	560 Ω	"	"
R108	QRD141J-220S	22 Ω	"	"
R109	QRD141J-104S	100 kΩ	"	"
R110	QRD141J-101S	100 Ω	"	"
R111	QRD141J-104S	100 kΩ	"	"
R112	QRD141J-562S	5.6 kΩ	"	"
R113	QRD141J-104S	100 kΩ	"	"
R114	QRD141J-104S	"	"	"
R115	QRD141J-220S	22 Ω	"	"
R116	QRD141J-101S	100 Ω	"	"
R117	QRD141J-223S	22 kΩ	"	"
R118	QRD141J-471S	470 Ω	"	"
R119	QRD141J-472S	4.7 kΩ	"	"
R120	QRD141J-183S	18 kΩ	"	"
R121	QRD141J-222S	2.2 kΩ	"	"
R122	QRD141J-821S	820 Ω	"	"
R123	QRD141J-101S	100 Ω	"	"
R124	QRD141J-104S	100 kΩ	"	"
R125	QRD141J-102S	1 kΩ	"	"

Others

Item No.	Part Number	Rating	Description
	E03706-007C	Connection Pin	Non Pole 7 Pin Connector Jack
	E03706-007D	"	"
	E03708-007C	Connection Socket	"
	E03723-001		Ferrite Bead for X101
	E35305-001		Shield Case
	E35361-001		Shield Cover
	E65097-001		
	E47746-004	Antenna Terminal	American Type } See page 41 for designated areas.
	E47746-006	"	European Type }

12-(2) TXX-76A Tuner P.C. Board Ass'y



Transistors

Item No.	Part Number	Rating		Description	Maker
		Pc	fT		
X106	2SC461 (C)	0.2 W	230 MHz	Silicon	Hitachi
X107	2SC461 (C)	〃	〃	〃	〃
X108	2SC461 (C)	〃	〃	〃	〃
X109	2SC458 (D)	〃	〃	〃	〃
X110	2SC458 (D)	〃	〃	〃	〃
X111	2SC458 (D)	〃	〃	〃	〃
X112	2SC458 (D)	〃	〃	〃	〃
X113	2SC458 (D)	〃	〃	〃	〃
X114	2SC458 (D)	〃	〃	〃	〃
X115	2SB560 (E)	0.75 W	100 MHz	〃	Sanyo
X116	2SC458 (D)	0.2 W	230 MHz	〃	Hitachi
X117	2SK68 (N, M)				NEC
X119	2SK68 (N, M)				〃
X120	2SK68 (N, M)				〃
X121	2SA872AV (D)	0.3 W	120 MHz	Silicon	Hitachi
X122	2SA872AV (D)	〃	〃	〃	〃
X123	2SC458 (D)	0.2 W	230 MHz	〃	〃
X124	2SA872AV (D)	0.3 W	120 MHz	〃	〃
X125	2SC458 (D)	0.2 W	230 MHz	〃	〃
X126	2SC458 (D)	〃	〃	〃	〃
X301	2SC1775AV (F)	0.3 W	200 MHz	〃	〃
X302	2SC1775AV (F)	〃	〃	〃	〃
X303	2SD313V (D, E)	30 W	8 MHz	〃	Sanyo
X304	2SC1775AV (F)	0.3 W	200 MHz	〃	Hitachi
X305	2SC1775AV (F)	〃	〃	〃	〃
X306	2SD325 (E)	10.0 W	8 MHz	〃	Sanyo
X311	2SA872AV (D)	0.3 W	120 MHz	〃	Hitachi
X312	2SB560 (E)	0.75 W	100 MHz	〃	Sanyo
X331	2SD313V (E)	30 W	8 MHz	〃	〃
X332	2SC1775AV (F)	0.3 W	200 MHz	〃	Hitachi
X333	2SC1775AV (F)	〃	〃	〃	〃
X334	2SC1775AV (F)	〃	〃	〃	〃
X335	2SA872AV (D)	〃	120 MHz	〃	〃
X336	2SC1775AV (F)	〃	200 MHz	〃	〃
X341	2SC1775AV (F)	〃	〃	〃	〃
X342	2SC1775AV (F)	〃	〃	〃	〃
X343	2SC1904 (V)	1 W	130 MHz	〃	Fujitsu

Integrated Circuits

Item No.	Part Number	Rating	Description	Maker
		Pc		
IC101	LA1221	0.3 W	I.C.	Sanyo
IC102	LA1221	〃	〃	〃
IC103	LA1222	〃	〃	〃
IC104	HA1137W	0.55 W	〃	Hitachi
IC105	LB1405	0.5 W	〃	Sanyo
IC106	LA1221	0.3 W	〃	〃
IC107	HA11211	0.73 W	〃	Hitachi
IC108	NJM4558D-D	0.5 W	〃	JRC
IC109	HA11223	0.5 W	〃	Hitachi
IC110	NJM4558D-D	0.5 W	〃	JRC

Diodes

Item No.	Part Number	Rating	Description	Maker
D111	1S2076-31		Silicon	Hitachi
D112	1S2076-31		"	"
D113	1S2076-31		"	"
D114	1S2076-31		"	"
D115	1S2076-31		"	"
D116	1S2076-31		"	"
D117	FC64M (L) White		Variable Capacitance	Fujitsu
D118	FC64M (L) White		"	"
D119	1S2076-31		Silicon	Hitachi
D120	1S2076-31		"	"
D121	1S2076-31		"	"
D122	1S2076-31		"	"
D123	1S2076-31		"	"
D124	1S2076-31		"	"
D301	S2VC20		"	Shindengen
D302	S2VC20R		"	"
D303	WZ-061	Zener Voltage: 6.1 V	Zener	JRC
D304	WZ-071A	" 7.1 V	"	"
D321	SIB01-02		Silicon	Fujidenki
D322	SIB01-02		"	"
D331	S2VC20		"	Shindengen
D332	S2VC20R		"	"
D333	1S2076-31		"	Hitachi
D334	1S2076-31		"	"
D335	1S2076-31		"	"
D336	1S2076-31		"	"
D337	SIB01-02		"	Fujidenki
D341	S2VC20	Plus Output	" (Black)	Shindengen
D342	S2VC20R	Minus Output	" (Red)	"
D343	WZ-071A	Zener Voltage: 7.1 V	Zener	JRC

Coils & Transformers

Item No.	Part Number	Rating	Description
LPF1	E03427-012		Low Pass Filter, LEFT Channel
LPF2	E03427-012		" RIGHT Channel
L111	E03695-001		Choke Coil
L112	E03695-001		"
L113	E03522-180J		" , 18 μH
L114	E03522-180J		" "
L115	E03522-180J		" "
L116	E03522-180J		" "
L117	E03522-180J		" "
L118	E03735-001		Anti-birdy Filter
L119	E03735-002		Delay Equalizer for A-B Filter
L301	E03695-001		Choke Coil
T103	E03134-027		Muting Detect Coil
T104	E03078-39	10.7 MHz	IFT
T105	E03134-028		PLL Discriminator Coil

Capacitors

Item No.	Part Number	Rating		Description
C141	QCF31HP-223	0.022 μF	50 V	Ceramic
C142	QCF31HP-223	″	″	″
C143	QCF31HP-223	″	″	″
C144	QCS31HJ-100	10 pF	″	″
C145	QCF31HP-223	0.022 μF	″	″
C146	QCF31HP-223	″	″	″
C151	QCF31HP-223	″	″	″
C152	QCF31HP-223	″	″	″
C153	QEW51CA-106	10 μF	16 V	Electrolytic
C154	QCF31HP-223	0.022 μF	50 V	Ceramic
C155	QCF31HP-223	″	″	″
C156	QCC31EM-473	0.047 μF	25 V	″
C158	QCC31EM-473	″	″	″
C159	QCF31HP-223	0.022 μF	50 V	″
C160	QCF31HP-223	″	″	″
C161	QCF31HP-223	″	″	″
C162	QCF31HP-223	″	″	″
C163	QCF31HP-223	″	″	″
C164	QCF31HP-223	″	″	″
C165	QAT3001-006			Trimmer, Ceramic
C166	QEW51HA-105	1 μF	50 V	Electrolytic
C167	QEW51CA-476	47 μF	16 V	″
C168	QEW51HA-474	0.47 μF	50 V	″
C169	QEW51HA-105	1 μF	″	″
C170	QEW51HA-105	″	″	″
C171	QCS31HJ-470	47 pF	″	Ceramic
C173	QEW51HA-475	4.7 μF	″	Electrolytic
C175	QCF31HP-223	0.022 μF	″	Ceramic
C176	QCF31HP-223	″	″	″
C177	QCF31HP-223	″	″	″
C178	QCF31HP-223	″	″	″
C179	QCF31HP-223	″	″	″
C180	QCF31HP-223	″	″	″
C181	QCF31HP-223	″	″	″
C182	QCC31EM-473	0.047 μF	25 V	″
C183	QCC31EM-473	″	″	″
C187	QEW51CA-106	10 μF	16 V	Electrolytic
C188	QEW51HA-225	2.2 μF	50 V	″
C189	QEW51AA-227	220 μF	10 V	″
C190	QEW51AA-227	″	″	″
C191	QCS31HJ-390	39 pF	50 V	Ceramic
C192	QCT25CH-680	68 pF		Ceramic, Temparature Compensate
C193	QCT25CH-680	″		″
C194	QCT25CH-101	100 pF		″
C196	QEW51EA-475	4.7 μF	25 V	Electrolytic
C197	QEW51CA-227	220 μF	16 V	″
C198	QFM31HK-153	0.015 μF	50 V	Mylar
C199	QFM31HK-152	1 500 pF	″	″
C220	QEB51EM-106	10 μF	25 V	Low Leak Current Electrolytic
C221	QFM31HK-473	0.047 μF	50 V	Mylar
C222	QFM31HK-152	1 500 pF	″	″
C223	QFM31HK-222	2 200 pF	″	″
C224	QFM31HK-103	0.01 μF	″	″
C225	QFM31HK-152	0.015 μF	″	″
C226	QFP32AJ-102	1 000 pF	100 V	Polypropylene
C227	QEB51EM-106	10 μF	25 V	Low Leak Current Electrolytic
C228	QEB51HM-474	0.47 μF	50 V	″
C229	QEB51EM-475 (M)	4.7 μF	25 V	″
C230	QEB51HM-474	0.47 μF	50 V	″
C231	QEB51EM-475	4.7 μF	25 V	″

Capacitors

Item No.	Part Number	Rating		Description
C232	QEB51EM-475	4.7 μF	25 V	Low Leak Current Electrolytic
C234	QEB51HM-474	0.47 μF	50 V	〃
C235	QEB51EM-475	4.7 μF	25 V	〃
C236	QEB51EM-475	〃	〃	〃
C237	QEB51EM-475	〃	〃	〃
C238	QEB51EM-475	〃	〃	〃
C239	QFP32AJ-102	1 000 pF	100 V	Polypropylene
C240	QFP32AJ-102	〃	〃	〃
C241	QFP32AJ-102	〃	〃	〃
C242	QFP32AJ-102	〃	〃	〃
C243	QFP32AJ-102	〃	〃	〃
C244	QFP32AJ-102	〃	〃	〃
C245	QEW51CA-107	100 μF	16 V	Electrolytic
C246	QEW51CA-107	〃	〃	〃
C249	QFM31HK-153	0.015 μF	50 V	Mylar
C250	QFM31HK-153	〃	〃	〃
C271	QEW51CA-107	100 μF	16 V	Electrolytic
C272	QEW51CA-106	10 μF	〃	〃
C273	QEW51HA-476	47 μF	50 V	〃
C274	QEB51HM-224	0.22 μF	〃	Low Leak Current Electrolytic
C275	QEB51EM-106	10 μF	25 V	〃
C301	QCF12HP-103	0.01 μF	500 V	Ceramic
C302	QCS31HJ-101	100 pF	50 V	〃
C303	QEV71HR-108	1 000 μF	〃	Electrolytic
C304	QEW51HA-476	47 μF	〃	〃
C305	QEW51CA-476	〃	16 V	〃
C306	QEW51CA-227	220 μF	〃	〃
C311	QEW51HA-476	47 μF	50 V	〃
C312	QEW51CA-226	22 μF	16 V	〃
C313	QEW51CA-227	220 μF	〃	〃
C314	QCS31HJ-101	100 pF	50 V	Ceramic
C321	QEW51HA-227	220 μF	〃	Electrolytic
C322	QEW51HA-227	〃	〃	〃
C323	QEW51VA-476	47 μF	35 V	〃
C324	QEW51EA-476	〃	25 V	〃
C325	QCF12HP-103	0.01 μF	500 V	Ceramic
C326	QEW51CA-227	220 μF	16 V	Electrolytic
C331	QCF31HP-103	0.01 μF	50 V	Ceramic
C332	QEW51EA-108 (M)	1 000 μF	25 V	Electrolytic
C333	QEW51CA-107	100 μF	16 V	〃
C334	QCF31HP-223	0.022 μF	50 V	Ceramic
C335	QEW51CA-106	10 μF	16 V	Electrolytic
C336	QCS31HJ-101	100 pF	50 V	Ceramic
C337	QEW51AA-107	100 μF	10 V	Electrolytic
C338	QEW51CA-106	10 μF	16 V	〃
C341	QCF12HP-103	0.01 μF	500 V	Ceramic
C342	QCS31HP-101	100 pF	50 V	〃
C343	QEV71JP-477	470 μF	63 V	Electrolytic
C344	QEW51HA-476	47 μF	50 V	〃
C345	QEW51CA-476	〃	16 V	〃
C346	QEW51VA-227	220 μF	35 V	〃

Resistors

Item No.	Part Number	Rating		Description
R141	QRD141J-122S	1.2 kΩ	1/4 W	Carbon
R142	QRD141J-331S	330 Ω	〃	〃
R143	QRD141J-102S	1 kΩ	〃	〃
R144	QRD141J-182S	1.8 kΩ	〃	〃
R145	QRD141J-331S	330 Ω	〃	〃
R146	QRD141J-220S	22 Ω	〃	〃
R147	QRD141J-471S	470 Ω	〃	〃
R148	QRD141J-102S	1 kΩ	〃	〃
E149	QRD141J-331S	330 Ω	〃	〃
R150	QRD141J-182S	1.8 kΩ	〃	〃
R151	QRD141J-563S	56 kΩ	〃	〃
R152	QRD141J-333S	33 kΩ	〃	〃
R153	QRD141J-561S	560 Ω	〃	〃
R154	QRD141J-331S	330 Ω	〃	〃
R156	QRD141J-332S	3.3 kΩ	〃	〃
R157	QRD141J-682S	6.8 kΩ	〃	〃
R158	QRD141J-332S	3.3 kΩ	〃	〃
R159	QRD141J-332S	〃	〃	〃
R160	QRD141J-102S	1 kΩ	〃	〃
R161	QRD141J-562S	5.6 kΩ	〃	〃
R162	QRD141J-123S	12 kΩ	〃	〃
R163	QRD141J-471S	470 Ω	〃	〃
R166	QRD141J-562S	5.6 kΩ	〃	〃
R167	QRD141J-823S	82 kΩ	〃	〃
R169	QRD141J-104S	100 kΩ	〃	〃
R170	QVP4AOB-473	47 kΩ		Variable, MUTING 1 Adjustment
R171	QVP4AOB-472	4.7 kΩ		〃 , MUTING 2 Adjustment
R172	QRD141J-123S	12 kΩ	1/4 W	Carbon
R173	QRD141J-182S	1.8 kΩ	〃	〃
R174	QVP4AOB-473	47 kΩ		Variable, Signal Level Adjustment
R175	QRD141J-182S	1.8 kΩ	1/4 W	Carbon
R176	QRD141J-472S	4.7 kΩ	〃	〃
R177	QRD141J-472S	〃	〃	〃
R178	QRD141J-183S	18 kΩ	〃	〃
R179	QRD141J-393S	39 kΩ	〃	〃
R180	QRD141J-393S	〃	〃	〃
R181	QRD141J-393S	〃	〃	〃
R184	QRD141J-560S	56 Ω	〃	〃
R185	QRD141J-102S	1 kΩ	〃	〃
R186	QRD141J-103S	10 kΩ	〃	〃
R187	QRD141J-331S	330 Ω	〃	〃
R188	QRD141J-561S	560 Ω	〃	〃
R189	QRD141J-102S	1 kΩ	〃	〃
R191	QRD141J-101S	100 Ω	〃	〃
R192	QRD141J-331S	330 Ω	〃	〃
R193	QRD141J-331S	〃	〃	〃
R194	QRD141J-561S	560 Ω	〃	〃
R195	QRD141J-103S	10 kΩ	〃	〃
R196	QRD141J-103S	〃	〃	〃
R197	QRD141J-222S	2.2 kΩ	〃	〃
R198	QRD141J-272S	2.7 kΩ	〃	〃
R199	QRD141J-182S	1.8 kΩ	〃	〃
R200	QRD141J-333S	33 kΩ	〃	〃
R201	QRD141J-104S	100 kΩ	〃	〃
R202	QRD141J-562S	5.6 kΩ	〃	〃
R203	QRD141J-562S	〃	〃	〃
R204	QRD141J-392S	3.9 kΩ	〃	〃
R205	QRD141J-123S	12 kΩ	〃	〃
E209	QRD141J-272S	2.7 kΩ	〃	〃
R210	QRD141J-103S	10 kΩ	〃	〃

Resistors

Item No.	Part Number	Rating		Description
R211	QRD141J-153S	15 kΩ	1/4 W	Carbon
R212	QRD141J-332S	3.3 kΩ	"	"
R213	QRD141J-272S	2.7 kΩ	"	"
R214	QRD141J-391S	390 Ω	"	"
R215	QRD141J-272S	2.7 kΩ	"	"
R216	QRD141J-222S	2.2 kΩ	"	"
R217	QVP4AOB-102	1 kΩ		Variable, Det. Gain Adjustment
R221	QRD141J-682S	6.8 kΩ	1/4 W	Carbon
R222	QRD141J-224S	220 kΩ	"	"
R223	QRD141J-822S	8.2 kΩ	"	"
R224	QRD141J-563S	56 kΩ	"	"
R225	QVP4AOB-222	2.2 kΩ		Variable, VCO Freerun Adjustment
R226	QRD141J-333S	33 kΩ	1/4 W	Carbon
R227	QRD141J-102S	1 kΩ	"	"
R228	QRD141J-103S	10 kΩ	"	"
R229	QRD141J-153S	15 kΩ	"	"
R230	QRD141J-184S	180 kΩ	"	"
R231	QRD141J-392S	3.9 kΩ	"	"
R232	QRD141J-392S	"	"	"
R233	QRG129J-101	100 Ω	1/2 W	Oxide Metal Film
R234	QVP4AOB-104	100 kΩ		Variable, Pilot Cancel
R235	QRD141J-103S	10 kΩ	1/4 W	Carbon
R236	QRD141J-103S	"	"	"
R237	QRD141J-562S	5.6 kΩ	"	"
R238	QRD141J-562S	"	"	"
R239	QRD141J-273S	27 kΩ	"	"
R240	QRD141J-273S	"	"	"
R241	QRD141J-102S	1 kΩ	"	"
R242	QRD141J-102S	"	"	"
R243	QRD141J-104S	100 kΩ	"	"
R244	QRD141J-104S	"	"	"
R245	QRD141J-104S	"	"	"
R246	QRD141J-104S	"	"	"
R247	QRD141J-681S	680 Ω	"	"
R248	QRD141J-681S	"	"	"
R249	QRD141J-221S	220 Ω	"	"
R250	QRD141J-221S	"	"	"
R251	QRD141J-332S	3.3 kΩ	"	"
R252	QRD141J-332S	"	"	"
R253	QRD141J-332S	"	"	"
R254	QRD141J-332S	3.3 kΩ	"	"
R255	QRD141J-272S	2.7 kΩ	"	"
R256	QRD141J-272S	"	"	"
R257	QRD141J-184S	180 kΩ	"	"
R258	QRD141J-184S	"	"	"
R259	QRD141J-272S	2.7 kΩ	"	"
R260	QRD141J-102S	1 kΩ	"	"
R261	QVP4AOB-473	47 kΩ		Variable, Separation Control
R262	QVP4AOB-473	"		"
R263	QRD141J-0R0S	Jumper		
R264	QVC3A2B-014V			Variable, 10 kΩ Twin, Output Level
R271	QRD141J-183S	18 kΩ	1/4 W	Carbon
R272	QRD141J-103S	10 kΩ	"	"
R273	QRD141J-183S	18 kΩ	"	"
R274	QRD141J-183S	"	"	"
R275	QRD141J-101S	100 Ω	"	"
R278	QRD141J-103S	10 kΩ	"	"
R278	QRD141J-272S	2.7 kΩ	"	"
R279	QRD141J-392S	3.9 kΩ	"	"
R280	QRD141J-183S	18 kΩ	"	"

Resistors

Item No	Part Number	Rating		Description
R281	QRD141J-184S	180 kΩ	1/4 W	Carbon
R282	QRD141J-273S	27 kΩ	"	"
R283	QRD141J-104S	100 kΩ	"	"
R284	QRD141J-184S	180 kΩ	"	"
R301	QRD141J-183S	18 kΩ	"	"
R302	QRD141J-123S	12 kΩ	"	"
R303	QRD141J-272S	2.7 kΩ	"	"
R304	QRD141J-562S	5.6 kΩ	"	"
R305	QRD141J-682S	6.8 kΩ	"	"
R311	QRD141J-223S	22 kΩ	"	"
R312	QRD141J-103S	10 kΩ	"	"
R313	QRD141J-272S	2.7 kΩ	"	"
R314	QRD141J-682S	6.8 kΩ	"	"
R315	QRD141J-103S	10 kΩ	"	"
R316	QRD141J-113S	11 kΩ	"	"
R312	QRD141J-562S	5.6 kΩ	"	"
R322	QRD141J-222S	2.2 kΩ	"	"
R323	QRD141J-103S	10 kΩ	"	"
R331	QRD141J-822S	8.2 kΩ	"	"
R332	QRD141J-332S	3.3 kΩ	"	"
R333	QRD141J-152S	1.5 kΩ	"	"
R334	QRD141J-182S	1.8 kΩ	"	"
R335	QRD141J-471S	470 Ω	"	"
R336	QVP4AOB-471	"		Variable, +5 V Adjustment
R337	QRD141J-562S	5.6 kΩ	1/4 W	Carbon
R338	QRD141J-682S	6.8 kΩ	"	"
R339	QRD141J-562S	5.6 kΩ	"	"
R340	QRD141J-333S	33 kΩ	"	"
R341	QRD141J-183S	18 kΩ	"	"
R342	QRD141J-123S	12 kΩ	"	"
R343	QRD141J-562S	5.6 kΩ	1/4 W	Carbon
R344	QRD141J-103S	10 kΩ	"	"
R345	QRD141J-472S	4.7 kΩ	"	"
R361	QRD141J-333S	33 kΩ	"	"
R362	QRD141J-564	560 kΩ	"	"

Others

Item No.	Part Number	Rating	Description
	E03686-008A	Connection Pin	Polous 7 Pin Connector Jack
	E03708-007C	Connection Socket	Non Pole 7 Pin Connector Jack
	E43727-002		Tab
	E60700-001		Ground Plate
	E61537-001		Heat Sink for X303
	E61537-001		Heat Sink for X331
	E61954-001		Shield Plate for Discriminator Top
	E61955-001		Shield Plate for Discriminator Bottom
	E65096-001		Battery Terminal
	E65601-001		Shield Plate for Frontend Bottom
	QSS2301-001E		Slide Switch for Demphasis
CF101	E03357-008 (R)	10.7 MHz	Ceramic Filter
CF102	E03357-008 (R)	"	"
CF103	E03734-001	"	Surface Acoustic Wave Filter
CF104	E03357-008 (R)	"	Ceramic Filter
	E65606-001		P.C. Board for Battery Cover
	E65607-001		"

12-(3) TDC-18B Synthesizer P.C. Board Ass'y

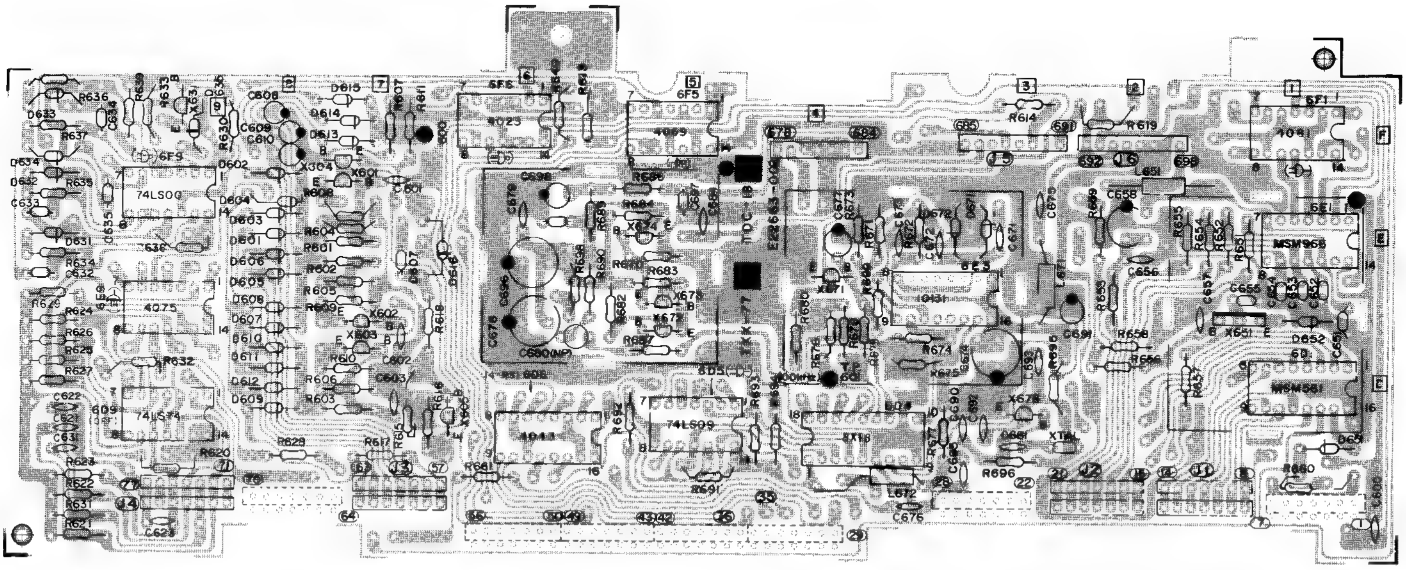


Fig. 31

Transistors

Item No.	Part Number	Rating		description	Maker
		Pc	fT		
X601	2SC458 (C)	0.2 W	230 MHz	Silicon	Hitachi
X602	2SC458 (C)	"	"	"	"
X603	2SC458 (C)	"	"	"	"
X604	2SC458 (C)	"	"	"	"
X605	2SC458 (C)	"	"	"	"
X631	2SC458 (C)	"	"	"	"
X651	2SC1904 (V)	1 W	130 MHz	"	Fujitsu
X671	2SC458 (C)	0.2 W	230 MHz	"	Hitachi
X672	2SC1775AV (F)	0.3 W	200 MHz	"	"
X673	2SC1775AV (F)	"	"	"	"
X674	2SC458 (C)	0.2 W	230 MHz	"	"
X675	2SC458 (C)	"	"	"	"

Integrated Circuits

Item No.	Part Number	Rating	Description	Maker
		Pc		
IC6D1	MSM561		I.C	Oki
IC6D4	8X08 (N)	0.6 W	"	Signetics
IC6D5	74LS09N		"	"
IC6D6	TC4043P		"	Toshiba
IC6D9	74LS74N		"	Singnetics
IC6E1	MSL966			Oki
IC6E3	10131	0.24 W	"	Signetics
IC6E9	MSM4075	0.2 W	"	Oki
IC6F1	MSM4081	"	"	"
IC6F5	MSM4069	0.2 W	"	"
IC6F6	TC4023P		"	Toshiba
IC6F9	74LS00N		"	Signetics

Diodes

Item No.	Part Number	Rating	Description	Maker
D601	1S2076-31		Silicon	Hitachi
D602	1S2076-31		"	"
D603	1S2076-31		"	"
D604	1S2076-31		"	"
D605	1S2076-31		"	"
D606	1S2076-31		"	"
D607	1S2076-31		"	"
D608	1S2076-31		"	"
D609	1S2076-31		"	"
D610	1S2076-31		"	"
D611	1S2076-31		"	"
D612	1S2076-31		"	"
D613	1S2076-31		"	"
D614	1S2076-31		"	"
D615	1S2076-31		"	"
D616	1S2076-31		"	"
D631	1S2076-31		"	"
D632	1S2076-31		"	"
D633	1S2076-31		"	"
D634	1S2076-31		"	"
D635	1S2076-31		"	"
D651	1S2076-31		"	"
D652	1S2076-31		"	"
D671	1S2076-31		"	"
D672	1S2076-31		"	"

Coils & Transformers

Items No.	Part Number	Rating	Description
L651	E03695-001		Choke Coil
L671	E03695-001		"
L672	E03695-001		"

Capacitors

Item No.	Part Number	Rating		Description
C600	QCF31HP-223	0.022 μF	50 V	Ceramic
C601	QCF31HP-223	"	"	"
C602	QCF31HP-223	"	"	"
C603	QCF31HP-223	"	"	"
C607	QFM31HK-563	0.056 μF	"	Mylar
C608	QEW51HA-105	1 μF	"	Electrolytic
C609	QEW51HA-105	"	"	"
C610	QEW51HA-105	"	"	"
C621	QCF31HP-223	0.022 μF	"	Ceramic
C622	QCF31HP-223	"	"	"
C623	QCF31HP-223	"	"	"
C631	QCF31HP-223	"	"	"
C632	QFP32AJ-681	680 pF	100 V	
C633	QFP32AJ-681	"	"	"
C634	QFM31HJ-472	4 700 pF	50 V	Mylar
C635	QFM31HJ-472	"	"	"
C651	QFM31HK-103	0.01 μF	"	"
C652	QFM31HK-103	"	"	"
C653	QFM31HK-103	"	"	"
C654	QFM31HK-103	"	"	"
C655	QFM31HK-472	4 700 pF	"	"
C656	QCF31HP-223	0.022 μF	"	Ceramic
C657	QCF31HP-223	"	"	"
C658	QEW50JA-227	220 μF	6.3 V	Electrolytic
C671	QCF31HP-103	0.01 μF	50 V	Ceramic

Capacitors

Item No.	Part Number	Rating		Description
C672	QCF31HP-103	0.01 μF	50 V	Ceramic
C673	QCF31HP-223	0.022 μF	"	"
C674	QEW50JA-227	220 μF	6.3 V	Electrolytic
C675	QCF31HP-223	0.022 μF	50 V	Ceramic
C676	QCF31HP-223	"	"	"
C677	QEW51CA-106	10 μF	16 V	Electrolytic
C678	QEW51HA-476	47 μF	50 V	"
C679	QCF31HP-223	0.022 ñF	"	Ceramic
C680	QEZ0046-475	4.7 μF		Electroltyic
C681	QCS31HJ-470	47 pF	50 V	Ceramic
C684	QCF31HP-223	0.022 μF	"	"
C690	QCS31HJ-101	100 pF	"	"
C691	QEW50JA-227	220 μF	6.3 V	Electrolytic
C692	QCS31HJ-471	470 pF	50 V	Ceramic
C693	QCS31HJ-121	120 pF	"	"
C695	QCF31HP-223	0.022 μF	"	"
C696	QEW51HA-476	47 μF	"	Electrolytic

Resistors

Item No.	Part Number	Rating		Description
R601	QRD141J-332S	3.3 kΩ	1/4 W	Carbon
R602	QRD141J-332S	"	"	"
R603	QRD141J-332S	"	"	"
R604	QRD141J-103S	10 kΩ	"	"
R605	QRD141J-103S	"	"	"
R606	QRD141J-103S	"	"	"
R607	QRD141J-103S	"	"	"
R608	QRD141J-472S	4.7 kΩ	"	"
R609	QRD141J-472S	"	"	"
R610	QRD141J-472S	"	"	"
R611	QRD141J-472S	"	"	"
R613	QRD141J-473S	47 kΩ	"	"
R614	QRD141J-0R0S	Jumper		
R615	QRD141J-473S	47 kΩ	1/4 W	Carbon
R616	QRD141J-472S	4.7 kΩ	"	"
R167	QRD141J-0R0S	Jumper		
R618	QRD141J-0R0S	"		
R619	QRD141J-0R0S	"		
R620	QRD141J-0R0S	"		
R621	QRD141J-472S	4.7 kΩ	1/4 W	Carbon
R622	QRD141J-472S	"	"	"
R623	QRD141J-472S	"	"	"
R624	QRD141J-103S	10 kΩ	"	"
R625	QRD141J-103S	"	"	"
R626	QRD141J-103S	"	"	"
R627	QRD141J-103S	"	"	"
R628	QRD141J-0R0S	Jumper		
R629	QRD141J-0R0S	"		
R630	QRD141J-333S	33 kΩ	1/4 W	Carbon
R631	QRD141J-472S	4.7 kΩ	"	"
R632	QRD141J-562S	5.6 kΩ	"	"
R633	QRD141J-472S	4.7 kΩ	"	"
R634	QRD141J-472S	"	"	"
R635	QRD141J-472S	"	"	"
R636	QRD141J-472S	"	"	"
R637	QRD141J-472S	"	"	"
R638	QRD141J-103S	10 kΩ	"	"
R639	QRD141J-103S	"	"	"
R640	QRD141J-0R0S	Jumper		
R651	QRD141J-331S	330 Ω	1/4 W	Carbon

Resistors

Item No.	Part Number	Rating		Description
R652	QRD141J-101S	100 Ω	1/4 W	Carbon
R653	QRD141J-391S	390 Ω	〃	〃
R654	QRD141J-101S	100 Ω	〃	〃
R655	QRD141J-101S	〃	〃	〃
R656	QRD141J-0R0S	Jumper		
R657	QRD141J-221S	220 Ω	1/4 W	Carbon
R658	QRD141J-822S	8.2 kΩ	〃	〃
R659	QRD141J-682S	6.8 kΩ	〃	〃
R660	QRD141J-103S	10 kΩ	〃	〃
R661	QRD141J-0R0S	Jumper		
R670	QRD141J-102S	1 kΩ	1/4 W	Carbon
R671	QRD141J-123S	12 kΩ	〃	〃
R672	QRD141J-332S	3.3 kΩ	〃	〃
R673	QRD141J-471S	470 Ω	〃	〃
R674	QRD141J-471S	〃	〃	〃
R675	QRD141J-471S	〃	〃	〃
R676	QRD141J-473S	47 kΩ	〃	〃
R677	QRD141J-0R0S	Jumper		
R678	QRD141J-562S	5.6 kΩ	1/4 W	Carbon
R679	QRD141J-223S	22 kΩ	〃	〃
R680	QRD141J-153S	15 kΩ	〃	〃
R682	QRD141J-562S	5.6 kΩ	〃	〃
R683	QRD141J-562S	〃	〃	〃
R684	QRD141J-562S	〃	〃	〃
R686	QRD141J-0R0S	Jumper		
R689	QRD141J-0R0S	〃		
R690	QRD141J-392S	3.9 kΩ	1/4 W	Carbon
R691	QRD141J-682S	6.8 kΩ	〃	〃
R692	QRD141J-682S	〃	〃	〃
R693	QRD141J-682S	〃	〃	〃
R694	QRD141J-102S	1 kΩ	〃	〃
R695	QRD141J-332S	3.3 kΩ	〃	〃
R696	QRD141J-184S	180 kΩ	〃	〃
R697	QRD141J-272S	2.7 kΩ	〃	〃
R698	QRD141J-681S	680 Ω	〃	〃
R699	QRD141J-223S	22 kΩ	〃	〃

Others

Item No.	Part Number	Rating	Description
	E03684-018	Dip 18 Pin	IC Socket
	E03686-007D	Connection Pin	Non Pole 7 Pin Connector Jack
	E03686-007D	〃	〃
	E03686-007D	〃	〃
	E03686-007D	〃	〃
	E03686-007D	〃	〃
	E03686-007D	〃	〃
	E03686-007D	〃	〃
	E03686-007D	〃	〃
	E03686-008A	Connection Plug	Connector Pin
	E03686-008A	〃	〃
	E03708-007C	Connection Socket	Non Pole 7 Pin Connector Jack
	E03708-007C	〃	〃
	E03708-007C	〃	〃
	E03708-007C	〃	〃
	E03708-007C	〃	〃
	E03708-007C	〃	〃
	E03708-007C	〃	〃
	E03708-007C	〃	〃
	E03737-002	3.6 MHz	Crystal Resonator
	E61954-001		Shield Plate for UP/DOWN Oscillator

12-(4) TDC-19B Control Logic P.C. Board Ass'y

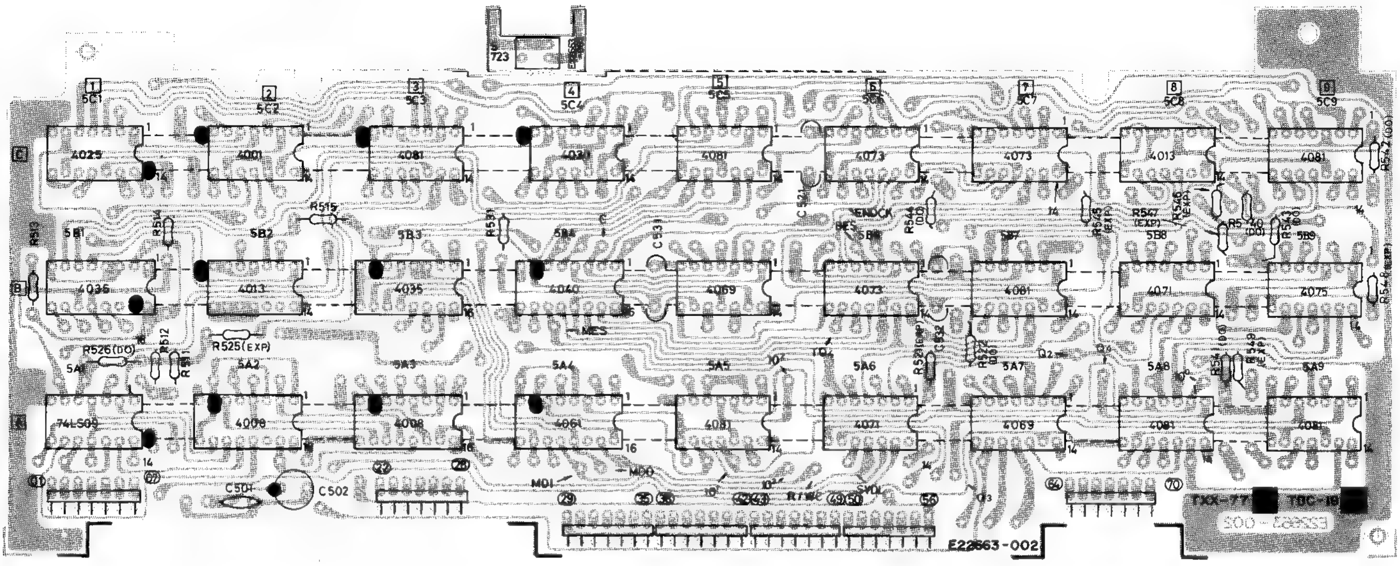


Fig. 32

Integrated Circuits

Item No.	Part Number	Rating	Description	Maker
		Pc		
IC5A1	SN74LS09N			
IC5A2	MSM4008	0.2 W	I.C	Oki
IC5A3	MSM4008	〃	〃	〃
IC5A4	MSM4061		〃	〃
IC5A5	MSM4081	〃	〃	〃
IC5A6	MSM4071	〃	〃	〃
IC5A7	MSM4069	〃	〃	〃
IC5A8	MSM4081	〃	〃	〃
IC5A9	MSM4081	〃	〃	〃
IC5B1	TC4035P		〃	Toshiba
IC5B2	TC4013P		〃	〃
IC5B3	TC4035P		〃	〃
IC5B4	TC4040P		〃	〃
IC5B5	MSM4069	0.2 W	〃	Oki
IC5B6	TC4073P		〃	Toshiba
IC5B7	MSM4081	0.2 W	〃	Oki
IC5B8	MSM4071	〃	〃	〃
IC5B9	MSM4075	〃	〃	〃
IC5C1	TC4025P		〃	Toshiba
IC5C2	TC4001P		〃	〃
IC5C3	MSM4081	0.2 W	〃	Oki
IC5C4	TC4030P		〃	Toshiba
IC5C5	MSM4081	0.2 W	〃	Oki
IC5C6	TC4073P		〃	Toshiba
IC5C7	TC4073P		〃	〃
IC5C8	TC4013P		〃	〃
IC5C9	MSM4081	0.2 W	〃	Oki

Capacitors

Item No.	Part Number	Rating		Description
C501	QCF31HP-223	0.022μF	50 V	Ceramic
C502	QEW51AA-476	47 μF	10 V	Electrolytic
C521	QFM31HK-272	2 700 pF	50 V	Mylar
C531	QFM31HK-102	1 000 pF	〃	〃
C532	QFM31HK-272	2 700 pF	〃	〃

Resistors

Item No.	Part Number	Rating		Description
R511	QRD141J-103S	10 kΩ	1/4 W	Carbon
R512	QRD141J-103S	"	"	"
R513	QRD141J-103S	"	"	"
R514	QRD141J-103S	"	"	"
R515	QRD141J-0R0S		"	"
R521	QRD141J-0R0S		"	"
R525	QRD141J-0R0S		"	"
R531	QRD141J-272S	2.7 kΩ	"	"
R545	QRD141J-0R0S		"	"
R546	QRD141J-0R0S		"	"
R547	QRD141J-0R0S		"	"
R548	QRD141J-0R0S		"	"
R549	QRD141J-0R0S		"	"

Others

Item No.	Part Number	Rating	Description
	E03706-007	Connection Pin	Non Pole 7 Pin Connector Jack
	E03706-007	"	"
	E03706-007	"	"
	E03706-007	"	"
	E03706-007	"	"
	E03706-007	"	"
	E03706-007	"	"
	E03736-001		Bus Line
	E03736-001		"
	E03736-001		"

12-(5) TDC-20B Front Panel P.C. Board Ass'y

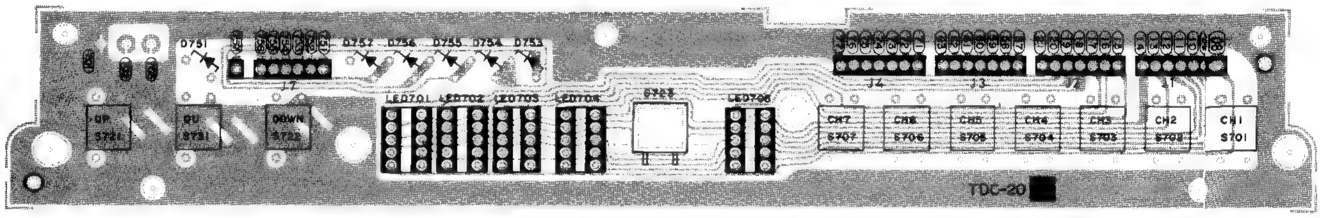


Fig. 33

Diodes

Item No.	Part Number	Rating	Description	Maker
D701	TLR312 (C, D)	Light Emitting Diode 7 Segments Display		Toshiba
D702	TLR312 (C, D)	"	0.1 MHz	"
F703	TLR312 (C, D)	"	1 MHz	"
F704	TLR312 (C, D)	"	10 MHz	"
D705	TLR312 (C, D)	"	Station Number	"
D753	SEL101R (B, C)	Light Emitting Diode	Signal 1	"
D754	SEL101R (B, C)	"	" 2	"
D755	SEL101R (B, C)	"	" 3	"
D756	SEL101R (B, C)	"	" 4	"
D757	SEL101R (B, C)	"	" 5	"
D758	SEL101R (B, C)	"	Stereo	"

Others

Item No.	Part Number	Rating	Description
P701	E03686-007E	Connection Pin	Non Pole 7 Pin Connector Jack
P702	E03686-007E	"	"
P703	E03686-007E	"	"
P704	E03686-007E	"	"
P705	E03686-008B	"	Polous 7 Pin Connector Jack

Others

Item No.	Part Number	Rating	Description
S701	QSP0021-001	Momentary Type	Push Switch, STATION 1
S702	QSP0021-001	"	" 2
S703	QSP0021-001	"	" 3
S704	QSP0021-001	"	" 4
S705	QSP0021-001	"	" 5
S706	QSP0021-001	"	" 6
S707	QSP0021-001	"	" 7
S722	QSP0021-001	"	" DOWN
S731	QSP0021-001	"	" QUICK
S721	QSP0021-001	"	" UP

12-(6) TSC-104B, C, D, Switches P.C. Board Ass'y

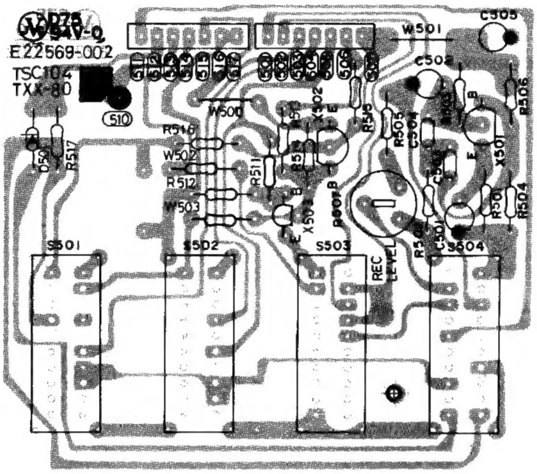


Fig. 34

Transistors

Items No.	Part Number	Rating		Description	Maker
		Pc	fT		
X501	2SC458 (D)	0.2 W	230 MHz	Silicon	Hitachi
X502	2SC458 (D)	"	"	"	"
X503	2SC458 (D)	"	"	"	"

Diodes

Item No.	Part Number	Rating	Description	Maker
D501	1S2076-31		Silicon	Hitachi

Capacitors

Item No.	Part Number	Rating		Description
C501	QEB51EM-475M	4.7 μF	25 V	Low Leak Current Electrolytic
C502	QEW51HA-474	0.47 μF	50 V	Electrolytic
C503	QFM31HJ-103	0.01 μF	"	Mylar
C504	QFM31HJ-103	"	"	"

Resistors

Item No.	Part Number	Rating		Description
R501	QRD141J-332S	3.3 kΩ	1/4 W	Carbon
R502	QRD141J-562S	5.6 kΩ	"	"
R503	QRD141J-103S	10 kΩ	"	"
R504	QRD141J-153S	15 kΩ	"	"
R505	QRD141J-273S	27 kΩ	"	"

Resistors

Item No.	Part Number	Rating		Description
R506	QRD141J-563S	56 kΩ	1/4 W	Carbon
R507	QVP4AOB-103	10 kΩ		Variable, REC. Level
R511	QRD141J-473S	47 kΩ	1/4 W	Carbon
R512	QRD141J-273S	27 kΩ	"	"
R513	QRD141J-682S	6.8 kΩ	"	"
R514	QRD141J-102S	1 kΩ	"	"
R515	QRG129J-561	560 Ω	1/2 W	Oxide Metal Film
R516	QRD141J-563S	56 kΩ	1/4 W	Carbon
R517	QRD141J-153S	15 kΩ	"	"

Others

Item No.	Part Number	Rating	Description
	E03706-007C	Connection Pin	Non Pole 7 Pin Connector Plug
P501	E03708-007C	Connection Socket	Non Pole 7 Pin Connector Jack
P502	E03708-007C	"	"
S501	QSL4314-002	3 Position Switch	Mode
S502	QSL4314-002	"	Muting
S503	QSL4314-002	"	Antibirdy
S504	QSL4214-002	2 Position Switch	Rec Level

12-(7) TPS-113B, C, D Primary Power P.C. Board Ass'y

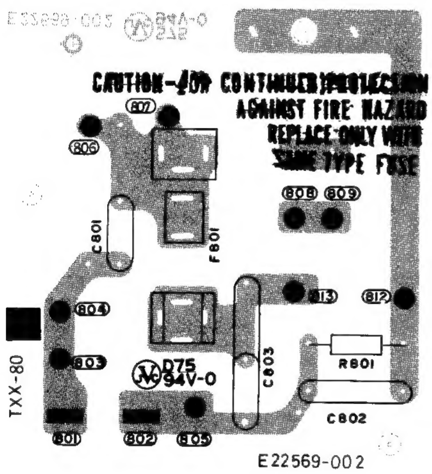


Fig. 35

12-(8) TXX-80-3B, 3C, 3D Voltage Selector

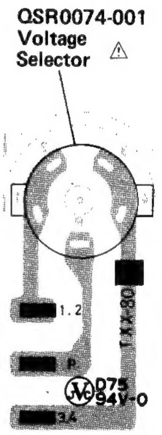


Fig. 36

Capacitors

Item No	Part Number	Rating		Description
C801	QFH53AM-103M	0.01 μF	1 000 V	Metallized Mylar ⚠

Resistors

Item No.	Part Number	Rating		Description
R801	QRC121K-475EM	4.7 MΩ	1/2 W	Composition See page 41 for designated areas. ⚠

Others

Item No.	Part Number	Rating	Description
	E45524-001	for F801	Fuse Clip } See page 41 for designated areas. ⚠
	E48965-002	for F801	Fuse Clip
F801	QMF61M2-R30	0.3 A Slow Blow	Fuse } See page 41 for designated areas. ⚠
F801	QMF51A2-R20	200 mA Time Lag	Fuse

NOTE: ⚠ SAFETY PARTS

13. Packing Materials and Part Numbers

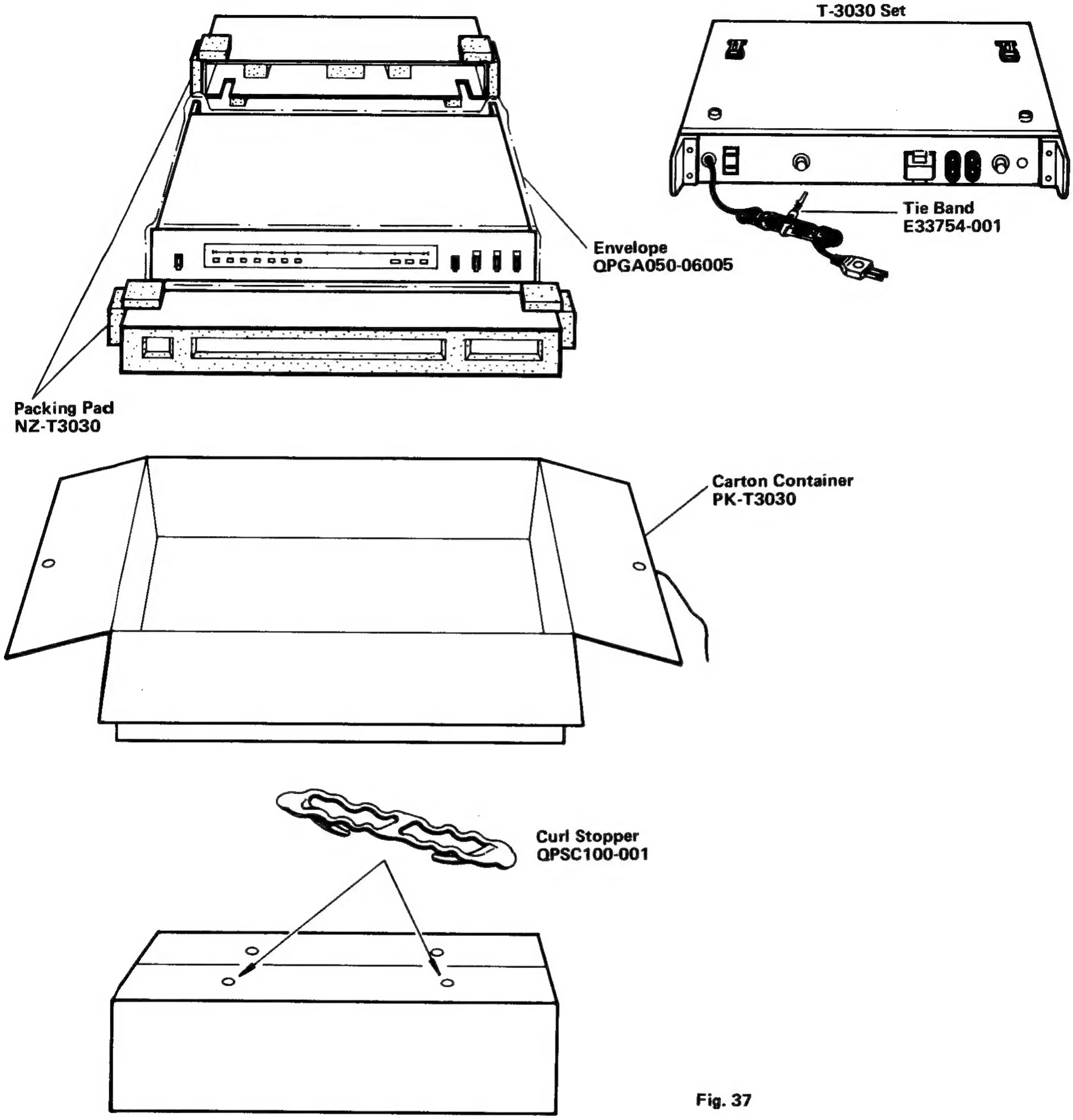


Fig. 37

14. Accessories List

Part Number	Description	Q'ty
E30580-667A	Instruction Book	1
E41202-2	Envelope	1
E03760-002	Signal Cord	1
4G13*	Battery (6 Volts) *MALLORY's PX-28 or EVEREADY's E544 are Suitable Substitutes for 4G13	1
E47746-005*	Antenna Cable Connector (American Type) *Attached Only for The Area fo U.S.A., Canada and U.S. Military Market.	1
See page 41 for designated areas.	Warranty Card	1

15. Parts List with Specified Numbers for Designated Areas

Page	Item No.	Description	For U.S.A. and Canada	For Europe	For U.K.	For U.S. Military Market and Other Countries
11, 22		Frontend P.C. Board Ass'y	TRF-37B	TRF-37C	TRF-37C	TRF-37B
11, 38		Switches P.C. Board Ass'y	TSC-104B	TSC-104C	TSC-104C	TSC-104D
11, 39		Primary Power P.C. Board Ass'y ⚠	TPS-113B	TPS-113C	TPS-113C	TPS-113D
11, 39		Voltage Selector ⚠	TXX-80-3B	TXX-80-3C	TXX-80-3C	TXX-80-3D
39	F801	Fuse ⚠	QMF61M2-R30 (0.3 A)	QMF51A2-R20 (0.2 AT)	QMF51A2-R20 (0.2 AT)	QMF61M2-R30 (0.3 A)
39		Fuse Clip ⚠	E45524-001	E48965-002	E48965-002	E45524-001
11		Power Cord with Plug ⚠	QMP1200-244	QMP3910-244	QMP9017-008	QMP1200-244
11		Power Switch ⚠	QSL2224-002	QSL2224-003	QSL2224-003	QSL2224-002
23		Antenna Terminal	E47746-004	E47746-006	E47746-006	E47746-004
39	C801	Capacitor ⚠	QFH53AM-103M	QFZ9007-103	QFZ9007-103	QFH53AM-103M
39	R801	Resistor ⚠	QRC121K475EM	–	–	QRC121K-475EM
40		Warranty Card	BT20023 BT20024B BT20032 } only for U.S.A. BT20025 only for Canada	–	BT20013B	BT20023 BT20024B BT20032 } only for U.S.A.

NOTE: ⚠ SAFETY PARTS